



Imperial Bureau of Plant Breeding and Genetics

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* General studies, see also individual crops.

Plant Breeding Abstracts

Vol. XVII, No. 1

Part I. Empire Section

*STATISTICS 519

1. FINNEY, D. J. 519.24:631.421
Orthogonal partitions of the 5 x 5 Latin squares.
Ann. Eugen., Camb. 1946 : 13 : 1-3.

An account is given of all possible orthogonal partitions of the 5 x 5 Latin square. The implications of the findings for experimental designs are elucidated.

*BREEDING 575

2. 575:633(41)
Scottish Society for Research in Plant-Breeding. Report by the Directors and Report by the Director of Research to the Annual General Meeting 18th July, 1946 : Pp. 41.

Wheat

Early ripening, short-strawed varieties developed in France are under investigation.

Oats

Trials of the following varieties are reported: Orion x Yelder (Aa 670), Castleton Potato x Yelder (Aa 676), [(Castleton Potato x Beseler's Prolific) x (Victory x Black Mesdag)] x Marvellous (Aa 705), Potato x Marvellous (Aa 707), (Castleton Potato x Yelder) x Elder (Aa 708), Elder x Marvellous (Aa 710), and [(Victory x Black Mesdag) x Victory] x Elder (Aa 711).

Elite stocks of Early Miller and Bell were grown.

Barley

Elite stocks of Craigs Triumph were produced.

Swede

The effect of inbreeding is under investigation. Trials are reported of pedigree lines, intervarietal hybrid strains, swede x turnip hybrids, and strains in which curled leaf and bulb formation are combined. Work on club root resistance continued. Small-scale trials of strains of various types developed at the station were also carried out; the strain AFT, derived from the cross Buffalo x Stirling Castle, gave the best yield of dry matter in November, combining high dry matter percentage and good bulb weight.

Potato

Breeding for resistance to the blight strains A, B and C, leaf roll, and the viruses X, Y, A, B and C, is reported.

Tests of the hypersensitive reactions of E.P.C.4, a variety derived from *S. demissum*, *S. simplicifolium*, and the progenies of these two species, to virus Y indicate that they are probably field immune, this reaction being heritable.

The seedling No. 655 (43), whose parentage involves *S. demissum*, is to be multiplied in Aberdeenshire. The seedling is a main crop variety, showing immunity to the blight strains A and C, and field immunity to the viruses A and C. Notes are given on the 15 seedlings which were multiplied at the Boghall Sub-Station.

Breeding material from Germany is under investigation. The material includes types which are reported to possess resistance to blight, viruses X and Y, leaf roll and frost.

* General studies, see also individual crops.

Kale

Curly Kale x Perpetual Kale hybrids were studied with a view to obtaining a form with highly curled leaves which could be vegetatively propagated. Study of the thousand-headed kale strain, TI, continued.

Broccoli

In the trials of strains bred at the station observations were made on frost resistance.

3.

575:633(54)

**Scientific Reports of the Imperial Agricultural Research Institute,
New Delhi, for the year ended 30th June, 1945 (1946) : Pp. 93.**

Wheat

The F_5 of the crosses *Triticum vulgare* x *Secale cereale* and *T. vulgare* x *Aegilops caudata* was investigated; promising plants possessing valuable characters, such as abundant tillering, long ears, amber or red coloured grains which were well filled, and a high degree of rust resistance were obtained. Among the F_4 and F_5 hybrids of *T. vulgare* and *Ae. caudata*, plants resembling *T. sphaerococcum* were observed, a fact which is interesting in connexion with the question of the origin of this species. The study of the mode of inheritance of branched ear, "extra glume" and glume colour in crosses of *T. Vavilovi* with *T. vulgare* and *T. sphaerococcum* was continued.

Work on loose smut and rust resistance is reported. F_{10} hybrids have been obtained which breed true for resistance to brown and yellow rust.

Maize

Inbreeding and experiments on hybrid vigour were continued.

Berseem

Seed-setting studies were carried out; the importance of bees for effective fertilization was established.

Potato

Study of Indian and foreign commercial varieties of *Solanum tuberosum* and of South and Central American species was continued with a view to future breeding. Progenies including F_1 and back-cross generations of interspecific crosses and a number of intervarietal hybrids are being studied for their resistance to frost, blight and virus diseases. The trials of new hybrids developed at Simla were continued at various hill stations in the Provinces and States; some of the hybrids have given promising results.

In tests of tuber reaction to *Fusarium Solani* (Mart) App. et Wr., Cult. 296, Cult. 394, Aya Papa and M 09 proved to be wholly resistant.

Luffa

Sex inheritance is under investigation in the cross between a hermaphrodite form of *L. acutangula* with clustered fruit and a monoecious form with solitary fruit.

Sugar cane

Bulk crosses at the Coimbatore Sugarcane Breeding Station included the following: Co. 349 x Co. 301, P.O.J. 2878 x Co. 301, Co. 421 x Co. 301, P. 4785 x Co. 301, Co. 464 x Co. 440 and P. 4785 x Co. 453. In the semi-bulk crosses, Co. 508 was used as both male and female parent, G. 1051, a seedling of the Burma form of *Saccharum spontaneum*, was included as a parent in the experimental crosses to introduce vigour and desirable growth habit. Crosses were made between eight sweet sorghum varieties as pollen parents and P.O.J. 2725, P.O.J. 213, Co. 349 and Vellai; one of these varieties possesses 13% sucrose content in the stalks. The following bamboo crosses were effected: B.h. IX x P.O.J. 2878, B.h. IX-57 x Co. 508, B.h. V x P. 4626 and B.h. V-24 x Co. 508.

In breeding for early and late maturity, early seedlings have been derived from Co. 349 x Co. 453, Co. 421 x G. 2291 (Co. 349 x bamboo), and P.O.J. 2878 x Co. 301, while late maturing seedlings have been developed from Co. 213 x Co. 313, Co. 349 x G. 3287 (Co. 349 x Uba Marrot) and Co. 508 x P.O.J. 2961.

The inheritance of pithiness was investigated in several crosses. Co. 301 used as pollen parent showed a tendency to transmit solidity of core to its progeny, even when crossed with a highly pithy cane such as P.O.J. 2878.

The fodder canes Co. 559, Co. 560 and Co. 561 have been produced from back-crosses of sugar cane x *Sorghum halepense* to *Sorghum halepense*.

Seedling canes are under observation with a view to suitability as chewing canes.

Investigations on salt resistance are in progress. G. 1051, a seedling of the Burma form of *Saccharum spontaneum*, Co. 432 and Uba Marrot possess a considerable degree of resistance. Breeding for drought and frost resistance is also under way; *Saccharum spontaneum* has been used as a source of hardiness. Certain protoplasmic qualities, such as bound water, sap concentration and viscosity, are under investigation in connexion with the drought and frost resistance studies.

An expedition is to be organized to collect the various forms of *Saccharum* and allied genera in India.

Cytogenetic studies have suggested that *Saccharum officinarum* varieties may possess recessive genes with an undesirable effect upon viability. Experiments have again shown that although sugar cane pollen remains viable for over a month, its actual fertilizing capacity is restricted to three days from the date of collection.

Data were obtained confirming the fact that Co. 421 often contributes a chromosome complement of $n = 43$, in addition to the haploid gametes with $n = 59$ which function in selfs and hybrids.

The non-flowering Burma form of *Saccharum spontaneum* has again been induced to flower by suitable photoperiodic treatment.

Soluble nitrogen content was found to remain low in the non-flowering variety Co. 442, in a comparison of the chemical composition of this non-flowering cane and the flowering variety Co. 421.

Notes are given on the new Co. seedlings distributed to the Provincial testing stations, viz. Co. 623–Co. 633 inclusive.

Tobacco

Interspecific differences in reaction to *Orobanche* were again noted. Frost resistant species and hybrids were grown and studied at Simla. The interspecific hybrid *Nicotiana Tabacum* x *N. quadrivalvis* was completely sterile. The F_6 progenies of selections from intervarietal *N. rustica* crosses were studied for growth, vigour, leaf size, colour, puckering, and maturity; certain selections appeared to be superior to the local type, I.P. 18. Various cigarette tobacco hybrids were further selected. Strains derived from Harrison's Special x Ambalema have shown considerable mosaic resistance.

Capsicum annuum

The seventh generation of colchicine-induced chilli tetraploids was studied; promising selections were obtained. Selection for increased fertility has not, however, proved to be successful. A bunch mutation of a recessive nature similar to that previously observed in I.P. 46A was found in I.P. 34.

Eruca sativa

Colchicine-induced tetraploids of taramira were studied, and promising selections with increased fertility and vigour were made from intervarietal crosses between tetraploids.

Brassica oil crops

Morphological and cytogenetical study of a large number of *Brassica* types cultivated in India was continued; a number of varieties from China were also grown and studied.

Investigations of the experimentally produced species *B. juncea* were continued, in respect of variability, sterility and cross-compatibility.

The apetalous character was again found to be due to a single recessive factor subject to the influence of modifiers. Crosses between tetraploid forms of apetalous and petalled plants are also under examination. The inheritance of the mucilaginous character of the testa was investigated in a cross between the apetalous mutant, possessing brown and mucilaginous seed, and yellow sarson, in which the seeds are yellow and non-mucilaginous. F_2 data indicated that the mucilaginous seed character is a single recessive to the non-mucilaginous, and yellow seed a single recessive to brown.

Studies of the mode of occurrence of apomixis in both self-fertile and self-sterile *Brassica* species were continued.

Colchicine-induced tetraploids of *B. nigra*, toria and sarson (*B. campestris*) and *B. Tournefortii* were studied in respect of several characters. Promising plants with increased fertility and vigour were selected from intervarietal crosses between tetraploids.

Sesamum orientale

The third generation of colchicine-induced sesame tetraploids was studied. The tetraploid form was similar to the diploid in growth, branching and capsule number per plant; but the capsules yielded a very low percentage of viable seeds. Crossability between the diploid and tetraploid forms in relation to pollen tube growth in the stylar tissue and embryo development were investigated.

Progenies of the amphidiploid *S. indicatum*, derived from the cross *S. orientale* ($2n = 36$) x *S. prostratum* ($2n = 32$), were studied with regard to their morphology, cytology and fertility.

Linseed

Selection of strains resistant to *Melampsora Lini* is in progress.

Tomato

Selections showing good fruit size, satisfactory yield and early maturity were obtained from back-cross progenies of *Lycopersicon esculentum* x *L. pimpinellifolium*.

Egg plant

Progenies of crosses between the T.12 variety of *Solanum Melongena* and *S. incanum*, and between Muktakeshi and *S. incanum* were studied in respect of the spiny character, colour, fruit size, bitterness, and reaction to borer attack. Promising selections were obtained. Other crosses, including *S. xanthocarpum* x *S. Melongena* and *S. xanthocarpum* x *S. indicum*, were also observed.

Hybrid vigour is under investigation, with a view to its possible commercial exploitation.

Cicer arietinum

The seventh generation of colchicine-induced tetraploids was studied; promising plants were selected. Selection for improved fertility has not, however, been successful. Further studies on the narrow leaf mutation show that the gene *nlv* determines the expression of the mutant characters of narrow leaf, narrow standard and keel, and slit ovary.

Pigeon pea

Selection of *Fusarium* wilt resistant strains from the cross I.P. 24 x I.P. 51 was continued. Indication has been obtained that mutant characters of abnormal flower and obcordate leaf are inherited as if conditioned by a single gene; further studies are in progress. A sepaloid mutant, conditioned by a single recessive gene, was observed in the variety C.P. 3.

4.

575:633(54.8)

Annual Administration Report of the Agricultural Department, Bangalore, for the year 1942-43 (1944) : Pp. 19.

Eleusine coracana

Improved types of ragi have been selected.

Sorghum vulgare

Selection is in progress.

Rice

Malnad, Semi-Malnad and Punaji selections, hybrid selections and summer paddies are under test.

Cotton

Trials to compare new Mysore-American cottons with the standards Co. 4 and M.A. II are in progress. Selection of the Egyptian cottons Giza 7 and Giza 12, and the Sea Island cotton V. 135, is also reported.

Sugar cane

The Thick Cane Breeding Scheme is in its tenth year; a large number of seedlings selected from hybridized and irradiated material are under investigation.

Tobacco

Breeding is in progress.

Coffee

Breeding at the Balehonnur Coffee Experimental Station is reported. Self and crossed seedlings have been obtained; seedlings of *C. stenophylla* are also to be investigated. The new strains S. 288 and S. 333 were distributed to the planters for further trial.

Cardamon

Breeding is reported.

Groundnut

The selections G. 0259 and G. 0776 are being multiplied. G. 0259 has a spreading habit; G. 0776 is an erect groundnut, and has given higher yields than the control varieties, H.G.1. and Spanish. Several new hybrid selections have outyielded H.G.1.

Pulses

Selections of thogari, avare, Bengal gram, horse gram and soya bean are under test.

5. 575:633(54.8)

Administration Report of the Acting Director of Agriculture for 1944.

Part IV.—Education, science, and art (D). Ceylon 1946 : Pp. D 23.

Rice

Data are given on the performance of several pure line selections. Dahanala selections have continued to show more resistance to stem-borer attack than other varieties. Selection of a drought resistant muppangan strain is in progress. Trials of resistance to salinity and floods are reported.

Cotton

Strain trials are reported; BP. 92, SG. 29, Cambodia CO. 2, Cambodia CO. 4 and Mwanza 613 gave high yields.

Sugar cane

As a result of a six years' trial the following varieties are to be introduced: Co. 349, Co. 421, Co. 419, Co. 281, Co. 290, Co. 331 and P.O.J. 2878.

Cassava

The classification of the Ceylonese strains is now complete (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1088, and Abst. 56 below). The 75 varieties recognized appear to have been derived by natural crossing between the sinyokka and manyokka types. This hypothesis is being tested genetically.

Cinchona

C. Ledgeriana has a higher total alkaloid and quinine content than cinchona hybrids. Strains of *C. Ledgeriana* have been selected for bark yield; further selection for the quinine content of the bark is to be carried out.

Chillies

Progenies of the Tuticorin selection, H.1, are under test.

Pyrethrum

Selection is in progress.

6. 575:633(66.9)

Annual Report on the Agricultural Department, Nigeria, for the year 1944 (1946) : Sess. Pap. No. 13 : Pp. 47.

Cotton

In northern Nigeria, new selections have been developed. Strain 26C, one of the most promising of the new strains, is now being multiplied. Selection was continued in southern Nigeria.

Coffee

Various types of *Coffea robusta* introduced have given yields of better quality than *C. liberica*.

Cocoa

Bean weight is being studied in progenies of selected plants. The data indicate that progenies of the tree T38 produce beans heavier than the average weight.

Chillies

Selection is in progress.

Oil palm

Progenies of high-yielding selections were planted for investigations on the inheritance of yielding capacity, fruit type and other characters.

Cinchona

Mixed bark samples from six trees of *C. Ledgeriana* have given an average quinine sulphate content of 10.2%. It is hoped to develop a bulk selection from these trees.

Mango

The Julie, Peter, Alphonse and Borsha varieties are under trial.

7.

575:633(93.1)

20th Annual Report of the Department of Scientific and Industrial Research, New Zealand 1946 : Pp. 110.

Wheat

Two advanced lines from the cross Tuscan x Tainui and Cross 7 x Tainui show promise. The protein content of the Cross 7 x Tainui selection is 14.0% compared with the 11.0% protein content of Cross 7. These selections also show resistance to Hessian fly.

Oats

Resistance x Onward and Resistance x Algerian hybrids were selected. F₈ hybrid lines from crosses between Resistance and Grey Winter, and between Resistance and Alaska, are to be grown for further selection. In breeding for rust resistance, F₂ lines of hybrids involving Victoria are to be selected.

Maize

A hybrid breeding project has been begun.

Barley

The stiff-strawed varieties Kenia, Maja, Victory and Wong have been crossed with Spratt Archer, Plumage Archer, Chevallier, Golden Archer, Gisborne, Pioneer and Campton* with the object of developing a high-yielding malting variety.

Forage crops

An extensive grass breeding programme is briefly described.

Breeding rye grass for resistance to blind-seed disease has been continued.

Hybrids between *Medicago glutinosa* and *M. sativa* are being studied to obtain a type combining the desirable characters of both species.

Swede

Dryland, from the cross Grandmaster x Sensation, and Sensation exhibited considerable aphid resistance. The Dryland variety has been crossed with Superlative in an attempt to eliminate the fangy root.

The high resistance of Sensation and Dryland to turnip mosaic has been confirmed in further tests.

Potato

Breeding work has been continued on a restricted scale. Two lines derived from a cross between Katahdin and *S. andigenum* show promise.

Flax

Breeding work has as its objectives the development of a high-grade fibre flax and a linseed resistant to rust and wilt.

Phormium

The variety 56 gives a strong yarn suitable for rope manufacture. Ngaro can be utilized for warp yarn, but is more suited to cordage than textile purposes. Leaf from the cross *P. Colensoi* x *P. tenax* produced a soft pliable fibre with considerably finer thread than Ngaro, and with excellent spinning qualities. Selections of this hybrid are to be further tested.

* The Cambridge variety Camton.

Tobacco

Progress in breeding flue-cured tobaccos resistant to black root rot is reported.

Medicinal plants

Selection of *Datura Stramonium* and *Atropa Belladonna* is in progress.

Apple

The cold storage quality of red types of Jonathan, Cox's Orange Pippin, Delicious and Dougherty apples was determined. The effect of rootstock on the cold storage quality of Cox's Orange Pippin, Jonathan, Delicious and Granny Smith was also investigated. The vitamin C contents of seven varieties after cold storage were determined. Sturmer again showed the highest vitamin C content and maintained its content very well during storage.

Rosa

Selections of various species of wild rose and sweet briar are being tested for vitamin C content.

Kale

Marrow-stem kale was crossed with several allied types to eliminate the undesirable quality of shedding the lower leaves. Promising selections have been obtained from crosses of marrow-stem kale with cabbage and thousand-headed kale.

Tomato

Hybrid vigour is being reinvestigated.

Work was continued on the breeding of a dwarf tomato resistant to *Cladosporium fulvum*.

Pea

Garden pea hybrids of William Massey x (Greenfeast x Greatcrop) and William Massey x [(Greenfeast x Greatcrop) x Harrison's Glory] were studied with a view to developing an early variety superior in yield to William Massey (Kelvedon Wonder); several of the lines were only a few days later in maturity than this variety and gave higher yields. Further crosses were made. Another aim of breeding work is the development of a Greenfeast (Lincoln) type resistant to pea mosaic, using a mutant form of Greenfeast as the resistant parent. Promising lines were obtained from the crosses Greenfeast mutant x Greenfeast and Greenfeast mutant x (Greenfeast x Greatcrop). Onward has been crossed with William Massey, Greenfeast and Greencrop with a view to developing a suitable canning variety. Field pea breeding work is being carried out with the object of developing a type which shows shorter straw, more uniform ripening, and improved seed quality. The Partridge variety has been crossed with Black Eyed Susan, Mammoth Blue and Dutch Blue.

8.

575:633(94)

Nineteenth Annual Report of the Council for Scientific and Industrial Research, Australia, for the year ended 30th June, 1945 :

No. 32 : Pp. 164.

Forage plants

Lucerne breeding has continued. A number of rust resistant progenies have been planted for further investigation. Additional selections have been made of material surviving heavy grazing and flooding.

Other herbage plants being studied include *Paspalum scrobiculatum*, *Phalaris tuberosa*, *Ehrharta Calycina*, *Festuca Mairei*, *Trifolium subterraneum*, *Stylosanthes gracilis*, *S. viscosa*, *Arachis Diogoi*, *Cajanus Cajan*, *Urochloa* spp., *Astragalus* spp., *Setaria spaciolata*, *Bromus marginatus* and *Lolium remotum*.

Potato

Hybridization work is in progress to combine field resistance to viruses A, X and Y, and leaf roll resistance. Hybrids hypersensitive to virus Y have been secured from crosses involving Snowflake, Brown's River and Katahdin (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 544). Differences in varietal susceptibility to leaf roll were observed; these differences were due to the reaction of the plant tissues to inoculation, not to the number of aphid vectors. Bismark is outstanding for its leaf roll resistance, and is both resistant to infection and intolerant of infection.

Papaver

Varieties of *P. somniferum* showed considerable differences in morphine and codeine contents, yield of dry matter, and date of ripening. Preliminary breeding work has been begun.

Oil crops

Varietal trials of linseed, rape, sesame, safflower and soya bean were conducted.

Duboisia

Leaves of *Duboisia myoporoides* and *D. Leichhardtii* were analysed for alkaloid content. A method of propagating both species successfully by cuttings has been developed and is being used to multiply selected tree types.

Rubber plants

The introduction of the Russian rubber plant krym-saghyz (*Taraxacum megalorrhizon*) is reported; investigations on guayule are in progress.

Onion

Breeding to improve processing quality is in progress.

Tomato

The inheritance of resistance to *Fusarium* wilt, early blight and leaf mould is being studied.

Peas and beans

Hybridization is being carried out to improve disease resistance and quality. In pea breeding, resistance to *Ascochyta pinodes* is receiving attention.

Insecticides

Strain trials of pyrethrum were conducted; *Pachyrhizus* spp. are under investigation.

***GENETICS 575.1**

9. PENROSE, L. S. 575.116.1:519.24
A further note on the sib-pair linkage method.
Ann. Eugen., Camb. 1946 : 13 : 25-29.

A discussion is presented of the value of the sib-pair technique and the utilization of *u*-functions in linkage determinations. A 3×3 table for dealing with sib-pairs is recommended in place of the 2×2 table previously used.

VARIATIONS, MODIFICATIONS, MUTATIONS 575.2

10. LEWIS, D. 575.243:537.531:581.162.5
Useful X-ray mutations in plants.
Nature, Lond. 1946 : 158 : 519-20.

A mutant allelomorph S'_6 has been produced by X-irradiation of *Oenothera organensis*. The new allele confers self-compatibility on plants carrying it in contrast to normal plants of the species which are self-incompatible.

***DISEASES AND INJURIES, BACTERIA, FUNGI 632**

11. LEDERBERG, J. and TATUM, E. L. 632.3:577.8
Gene recombination in *Escherichia coli*.
Nature, Lond. 1946 : 158 : p. 558.

A mixed culture of two strains of *E. coli*, each respectively defective in the capacity to form three essential nutrients (threonine, leucine and thiamin in the first case, biotin, phenylalanine and cystine in the second), was found to give rise to wild-type strains with no deficiencies, also strains with only one or two deficiencies.

It is suggested that, since sterile filtrates of the two strains appear unable to induce the observed transformation, combination of characters occurred through sexual fusion.

* General studies, see also individual crops.

12. BABU NAIDU, M. and
BAKSHI, V. M. 632.422.3:576.312:578.65
The cytology of yeast.
Curr. Sci. 1946 : 15 : p. 231.

The authors observed 12 chromosomes in actively dividing cells of *Saccharomyces cerevisiae*. When Feulgen's reagent was used for staining, certain bodies were stained which were not definite in size, shape and number. Slides stained with toluidine blue, however, have indicated the presence of two bodies in addition to the chromosomes. These additional bodies are reported to be easily distinguishable from the chromosomes by their small size and separate position in the cell. It is suggested that they should be regarded as centrioles.

13. LEVAN, A. 632.422.3:581.04:576.356.5
Mitotic disturbances induced in yeast by chemicals, and their significance for the interpretation of the normal chromosome conditions of yeast.
Nature, Lond. 1946 : 158 : p. 626.

Descriptions are given of the effect on yeast mitosis exerted by camphor and by benzene. It is believed that at least ten chromosomes are present in *Saccharomyces cerevisiae*, the lower numbers reported by some authors being regarded as artifacts caused by clumping.

14. 632.8
Heterogenesis and the origin of viruses.
Nature, Lond. 1946 : 158 : 406-07.

This report of a symposium held by the Society for General Microbiology at Leeds gives a useful review of the various theories that are now current as to the origin of viruses. The two principal theories are firstly that viruses are degraded parasites and secondly that viruses have arisen from self-multiplying cytoplasmic units. It is possible, moreover, that different viruses have arisen in different ways, in which connexion it is interesting to record Burnet's suggestion that bacteriophages are parasitic descendants of precellular stages in the evolution of present-day living forms.

15. JONES, M. A.,
WHITE, D. G. and
PAGÁN, C. 632.951.1:581.192
Evaluation of some clones of *Derris elliptica*.
Trop. Agriculture, Trin. 1946 : 23 : 89-93.

Trials of clones of Changi No. 3 with high rotenone content are reported. Significant clonal differences in rotenone content were obtained. Root yield and root quality were found to be inversely related.

WHEAT 633.11

16. 633.11:575(67.62)
Annual Report of the Department of Agriculture, Kenya 1944
(1945) : Pp. 8.

The development of improved rust resistant wheat varieties is the chief work carried out at the Plant Breeding Station, Njoro. The new wheat No. 291 (Australian 26.A x 58.F) has yielded well on the better soils. Early maturing strains of Cross 294 (Australian 26.A x 117.A) and Cross 261 (68.E 12.A.1 x Reliance) are being multiplied. New crosses were made in which the Australian wheat Warigo was used; this variety is resistant to a number of diseases, including flag smut.

17. ALLEN, G. 633.11:575(71)
Grain growers visit Brandon Experimental Farm; see new Redman wheat development.
Canadian Grain J. 1946 : 2 : No. 1 : p. 15.

A brief account is given of recent developments in cereal breeding in Canada. Mention is made of the new wheat variety, Redman, bred from a cross between Regent and Canus. Redman is highly resistant to races of stem rust and moderately resistant to leaf rust. In yield it equals Thatcher; in milling and baking qualities it is similar to Marquis.

18.

633.11:575(94)

Cereal Crops.

Commonw. Agric. 1946 : 17 : 3-9.

Wheat varieties recommended for cultivation in Victoria are given.

The new wheat hybrids, Ghurka x White Fife L. 5266 T. 39-1-1 and Ghurka x Pusa 4 M 4510 V 9-2, are to be multiplied and released in 1947. They possess particularly good gluten quality.

In the 1945 trials the new variety Insignia has given an outstanding performance in the Mallee region (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1497). Javelin, a new wheat developed from a cross between Nabawa and Onas, has given promising results.

The new wheat variety Pinnacle, particularly suitable for the Wimmera area, is briefly described (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1497).

19.

SIM, J. T. R.,
HENNING, P. D. and
HENNING, C. B.

633.11:581.48:578.088(68)

Kernel characteristics of the bread-wheat varieties grown in South Africa.

Bull. Dep. Agric. S. Afr. 1945 : No. 253 : Pp. 64.

The technique of kernel identification is described in detail. The bulletin presents a key to the identification of 56 different wheat varieties grown in South Africa, and descriptive notes on each variety. Photographs of the kernels of each variety are included.

20.

GILMER, W. E.,
FRIESON, H. A. and
HARRINGTON, J. B.

633.11:581.48:632.1-1.521.6(71)

The resistance of wheat varieties to seed bleaching.

Sci. Agric. 1946 : 26 : 437-47.

In field and laboratory tests during 1944 and 1945 of resistance to bleaching or weathering of the ripe wheat grain, significant varietal differences in resistance were obtained. The observations indicated that resistance to bleaching is a quantitatively inherited character. Several lines of the cross Thatcher x Apex exceeded the resistance of the more resistant parent Apex. Resistance to seed bleaching was found to be correlated with lateness of maturity. The results of field and laboratory tests showed close agreement. The laboratory method involved the principle of wetting and drying. The most satisfactory procedure was as follows: the samples were wetted for ten minutes, and then dried either in a dryer at 200° F. or in the open air at room temperature. In view of the labour and expense involved in field tests it is suggested that the laboratory method of testing is preferable.

21.

COOK, L. J. and
FARQUHAR, A. J.

633.11:581.6(94)

Baking quality of wheat. Influence of environment on varieties.

J. Dep. Agric. S. Aust. 1945 : 49 : 191-96, 291-95, 399-412.

A report is given of the results of six years' wheat trials carried out to investigate the baking quality of several varieties when grown at different locations. Data on bushel weight, protein content and flour strength are presented.

22.

JOHNSON, T. and
NEWTON, M.

633.11-2.452:576.16:631.521.6(71)

The occurrence of new strains of *Puccinia triticina* in Canada and their bearing on varietal reaction.

Sci. Agric. 1946 : 26 : 468-78.

The rust resistance of Regent, Renown and wheat varieties derived from Hope and H-44 has recently broken down in various parts of Canada. Some of the strains attacking these wheats are biotypes of known races such as races 5 and 15; the most commonly occurring race has, however, been identified as race 128. Certain wheats have remained unaffected by these new strains of leaf rust, particularly K-33, Chinese x Marquis, and Warden x Hybrid English W325. Hybrid lines derived from the cross [McMurachy x (Warden x Hybrid English W325)], and the South American varieties Frontana, Fronteira and La Prevision 25 also appear to offer possible sources of rust resistance in further breeding work.

23. GLYNNE, M. D. and
MOORE, F. J. 633.11-2.484-1.521.6(42)
Eyespot and lodging in wheat.
J. Minist. Agric. 1946 : 53 : 305-08.

This discussion of the effects of eyespot disease (*Cercospora herpotrichoides*) includes a brief reference to the varietal factor.

BUCKWHEAT 633.12

24. FROLOVA, S. L.,
SACHAROV, V. V. and
MANSUROVA, V. V. 633.12:581.162.5
**Homostyly of the flowers of buckwheat as a morphological
manifestation of sterility.**
Nature, Lond. 1946 : 158 : p. 520.

Homostylic flowers of buckwheat are sterile. Although microsporogenesis is normal, degeneration begins in the anther almost immediately afterwards. In other cases, degeneration occurs in the gynoeceum.

25. FROLOVA, S. L.,
SACHAROV, V. V. and
MANSUROVA, V. V. 633.12:581.162.5:576.356.5
Cytological basis of high fertility in autotetraploid buckwheat.
Nature, Lond. 1946 : 158 : p. 520.

A description is given of the course of meiosis in colchicine-induced autotetraploids of the buckwheat variety Bolshevik. Highly fertile tetraploids with regular chromosomal divisions have been obtained.

MAIZE 633.15

26. HARLAND, S. C. 633.15:575(85)
A new method of maize improvement.
Trop. Agriculture, Trin. 1946 : 23 : p. 114.

A preliminary account is given of a method of breeding by means of which superior genotypes giving yields above the arithmetic mean of a population can be selected and multiplied. The technique has advantages over the standard pure line methods, providing a cheap and rapid means of improving a commercial variety well within the scope of small experimental stations. It is also suggested that the method should be valuable for the improvement of other crops such as forest trees and coconuts, and possibly also cocoa and rubber, in addition to maize.

27. MOSTERT, J. F. T. 633.15:575.12(68)
Hybrid maize prospects in South Africa.
Fmr's Wkly, Bloemfontein 1946 : 71 : 2400-01.

The problems of developing hybrid maize for cultivation in South Africa are discussed; it is suggested that F_2 generation seed could be used until sufficient hybrid seed is available.

28. KERLE, W. D. 633.15.00.14(94.4)
Maize variety recommendations for 1946 sowing.
Agric. Gaz. N.S.W. 1946 : 57 : 411-13, 443.

Varieties recommended for the different maize-growing districts of New South Wales are listed.

BARLEY 633.16

29. MUKERJI, B. K. and
AGARWAL, R. R. 633.16:581.6(54)
**Preliminary study on the influence of variety, manures and
irrigation on the composition and quality of barley.**
Indian J. Agric. Sci. 1944 : 14 : 109-16.

Data are given on the brewing and feeding quality of ten barley varieties. Environmental factors were found to have a considerably greater effect upon chemical composition than variety.

30. PUGSLEY, A. T. and VINES, A. 633.16-2.451.2-1.521.6:575(94)
Breeding Australian barleys resistant to covered smut.
 J. Aust. Inst. Agric. Sci. 1946 : 12 : 44-47.

Approximately 50 Australian and American varieties of barley have been tested for their reaction to covered smut (*Ustilago Hordei*) in South Australia. In two years' trials the following varieties were found to remain free from infection: Arlington Awnless, Chevron, Duplex, Gopal, Hillsa, Kwan, Lyallpur, Nepal, Nigrate, Peatland and Peruvian. The commercial Australian varieties were in general susceptible. Investigations on the physiological races of covered smut in Australia are reported.

The Kwan variety has been chosen as a parent in breeding for resistance to powdery mildew and covered smut, on account of its resistance to both these diseases. The preliminary results from a study of the cross between the covered smut susceptible Cape and the resistant Kwan, indicate that the latter variety possesses more than two dominant genes for resistance to covered smut. A back-crossing programme is in progress to impart the resistance of Kwan to commercial Australian barleys.

FORAGE GRASSES 633.2

31. PARTHASARATHY, N. 633.289:576.312.35
Chromosome numbers in *Bambuseae*.
 Curr. Sci. 1946 : 15 : 233-34.

The chromosome number of *Dendrocalamus arundinacea* was found to be $2n = 70$ after both meiotic and mitotic chromosome counts.

LEGUMINOUS FORAGE PLANTS 633.3

32. FYFE, J. L. 633.361:581.04:576.356.5
Polyploidy in sainfoin.
 Nature, Lond. 1946 : 158 : p. 418.

Chromosome duplication in sainfoin has been obtained by means of colchicine, and fertile hybrids have been produced by crossing untreated and treated forms. Meiosis in a 40-chromosome hybrid is described, furnishing evidence together with other facts that normal sainfoin is a tetraploid.

ROOTS AND TUBERS 633.4

33. M'MASTER DAVEY, V. 633.426:582
Classification in the swede.
 Scot. J. Agric. 1946 : 26 : 39-43.

The problems of classifying swede varieties are discussed. An identification key is given for the different types.

34. HUDSON, P. S. 633.491:575(42)
Work on the South American Potato Collection up to 31st December, 1945.
 16th Rep. Imp. Agric. Bureaux Executive Coun., London 1944-1945
 (1946) : 26-27.

The Empire Potato Collection was grown in the year under review for the first time in the new glasshouses provided by the Nuffield Trust. The plants were separated according to virus content and length of day requirements, and growth was satisfactory in the majority of cases.

Systematic and cytological work has been continued. Lines were tested for their reaction to viruses X, A and Y.

Certain lines showed promising eelworm resistance. The wild species, *S. Ballii*, proved to be quite immune to eelworm attack; further tests are to be carried out to verify this result. An experiment was set up to determine whether plants grown under long and short day conditions exhibit any difference in eelworm susceptibility.

Varietal tests for frost resistance are reported.

Tests for vitamin C, protein and dry matter contents were conducted.

The photoperiodic reaction of two domestic varieties was ascertained with normal and "bolter" strains in order to elucidate the nature of the "bolter" condition (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1521).

35. CÁRDENAS, M. and
HAWKES, J. G. 633.491:582(84 + 85)
New and little-known wild potato species from Bolivia and Peru.
J. Linn. Soc. (Bot.) 1946 : 53 : 91-108.

The following new wild potato forms are figured and described: *Solanum raphanifolium*, *S. Hawkesii*, *S. decurrentilobum*, *S. toralapanum*, *S. ellipsifolium*, *S. Weberbaueri* var. *poscoanum*, *S. mollepujroense*, *S. anomalocalyx* var. *llallaguanianum*, *S. anomalocalyx* var. *brachystyla*, *S. anomalocalyx* var. *muralis* and *S. liriunianum*. The name *S. xerophyllum* is substituted for *S. microphyllum* Hawkes.

FIBRES 633.5

36. LORD, E. 633.51(72.9)
The production and characteristics of the world's cotton crops.
J. Text. Inst., Manchr. 1946 : 37 : T151-T179.

A detailed account is given of the cotton varieties grown in the British and non-British West Indies.

37. PANSE, V. G. 633.51:519.271.3(54)
Plot size in yield surveys on cotton.
Curr. Sci. 1946 : 15 : 218-19.

The results of an experiment on the problem of plot size in the sampling of cotton yield are discussed.

38. ANSON, R. R. 633.51:575(62.4)
Local cotton history in the Sudan, 1942-1946.
Emp. Cott. Gr. Rev. 1946 : 23 : 77-82.

An account is given of breeding investigations carried out on Egyptian and American cottons during the period 1942-46 in the Anglo-Egyptian Sudan.

39. LORD, E. 633.51:575(62.4)
A textile technologist in the cotton field—1.
Emp. Cott. Gr. Rev. 1946 : 23 : 83-89.

Cotton research in progress in the Anglo-Egyptian Sudan is described.

40. IYENGAR, N. K. 633.51:575.127.2:576.354.4
Cytological investigations on hexaploid cottons.
Indian J. Agric. Sci. 1944 : 14 : 142-51.

Meiosis was investigated in hexaploids obtained by colchicine treatment of the shoots of sterile triploids possessing the following parentages: *G. herbaceum* var. *frutescens* x *G. hirsutum*, *G. herbaceum* var. *frutescens* x *G. barbadense*, *G. arboreum* x *G. hirsutum*, *G. Thurberi* x *G. barbadense*, *G. armourianum* x *G. barbadense*, *G. anomalum* x *G. hirsutum*, and *G. anomalum* x *G. barbadense*. Most of the plants in the progenies of the hexaploids possessed 78 chromosomes, suggesting that, in the hexaploids, gametes with 39 chromosomes function most and that some of the gametes have the same genetic constitution as the triploid parents. Fertile tetraploids were obtained by crossing the hexaploid between *G. herbaceum* and *G. hirsutum* with *G. armourianum*; during meiosis the chromosomes paired mostly as bivalents. Meiotic behaviour is discussed in relationship to genomic constitution. The data obtained confirm the hypothesis that the cultivated American cottons are allopolyploids possessing two sets of Asiatic and two sets of wild American chromosomes.

41. FREEMAN, W. E. 633.51:575.42(66.9)
"Samaru 26 C" a new strain of cotton bred in Northern Nigeria.
Trop. Agriculture, Trin. 1946 : 23 : 109-13.

Samaru 26 C is a new strain selected from the commercial variety Allen (*Gossypium*

hirsutum). A detailed account is given of the development of this strain by continued single plant selection from the original selection D31, obtained in 1931. Samaru 26 C equals Allen in quality, but gives higher yields per acre.

42. KNIGHT, R. L. 633.51-2.3-1.521.6:575.11
Breeding cotton resistant to blackarm disease (*Bact. malvacearum*). Part 1. Introductory.
 Emp. J. Exp. Agric. 1946 : 14 : 153-60.

A brief survey is given of the distribution within *Gossypium* of types showing resistance to blackarm (*Bacterium malvacearum*), and the value of the resistance factors, B_1 , B_2 and B_3 , in breeding *G. barbadense* and Upland (*G. hirsutum*) cottons is described. A list classifying the chief American Upland varieties on the basis of their genetic constitution in respect of the B_2 and B_3 factors is included.

43. MCGREGOR, W. G. 633.52(71)
The production of flaxseed in Canada.
 Fmrs' Bull. Dep. Agric. Canada 1946 : No. 23 : (Publ. 545) Pp. 16.

Descriptive notes are included on the following flax varieties: Royal, Redwing, Bison, Viking, Buda, Crown, Premost, Renew, Koto and Crystal.

44. SABNIS, T. S. and MEHTA, T. R. 633.52:581.4:575.11.061.6
Some observations on the genetics of linseed.
 Indian J. Agric. Sci. 1945 : 15 : 263-65.

The inheritance of petal, anther and seed colour was investigated in the cross between English White and C.P. White linseed. Colour expression in the petals was found to be determined by five genes, as follows. Two factors, designated *A* and *B*, condition the production of pigment in the petals, and interact with each other to cause the development of a pink coloration. A factor *D* modifies the pink colour to lilac; in the absence of *B* and the presence of *E*, *D* determines the occurrence of a faint tinge of blue. A factor designated *E* intensifies petal colour. The dilution of petal colour is brought about by the action of a factor designated *F*. The C.P. White and English White varieties are analysed as being of the genetic constitution *BB CC dd EE FF* and *bb CC DD EE FF*, respectively, with regard to petal colour.

Brown seed colour was found to be due to the presence of two factors, designated *G* and *M*, and fawn seed colour to be due to the operation of *M* only.

Light blue anther colour showed a simple dominance to salmon.

45. MUSKETT, A. E., COLHOUN, J., CALVERT, E. L. and MCCREARY, C. W. R. 633.52-2.4-1.521.6(41.5)
Investigations by the Plant Disease Division, Ministry of Agriculture. Diseases of flax.
 19th Rep. Agric. Res. Inst. N. Ire. 1945-46 : p. 25.

Flax and linseed varieties from both Europe and America, and certain selections not yet propagated on a large scale, were tested for their reaction to *Polyspora Lini*, *Colletotrichum linicola*, *Phoma* sp. and *Melampsora Lini*, as in the three previous years. Varietal differences in reaction to the various diseases were again observed.

46. CASS SMITH, W. P. and HARVEY, H. L. 633.52-2.452:576.16:631.521.6(94)
Flax rust in Western Australia.
 J. Dep. Agric. W. Aust. 1946 : 23 : 42-45.

Investigations on the physiological races of *Melampsora Lini* are reported. It is mentioned that certain varieties, including Ottawa 770 B and Argentine Selection (C.I. No. 462), have shown immunity in all the experimental plots; others, including Uruguay 36/48, have shown considerable resistance. It is noted that the new variety Wada (cf. Abst. 48) has remained free from the disease.

47. MILLINGTON, A. J. 633.52-2.452-1.521.6(94)
Wada, a rust-resistant flax variety.
 J. Aust. Inst. Agric. Sci. 1946 : 12 : 50-51.
 An account is given of the new Wada variety (cf. Abst. 48).

48. THOMAS, I. and
 MILLINGTON, A. J. 633.52-2.452-1.521.6:575.12(94)
Flax and linseed breeding in W.A. Wada, a new rust resistant flax variety.
 J. Dep. Agric. W. Aust. 1946 : 23 : 39-42.

In the flax breeding programme of western Australia, hybridization between rust immune linseed varieties and susceptible flaxes, including repeated back-crossing to the flax parent, is in progress. Selection of already existing varieties for rust resistance has also been carried out. The new rust resistant variety Wada has been developed from Riga Crown. Wada matures early, and resembles Liral Crown in growth and appearance. Rust resistant selections of crosses between Wada and Concurrent are to be tested against the former variety. The production of early maturing, rust resistant linseed varieties adapted to local conditions is also in progress.

49. 633.523:575(54)
Progress of technical schemes. Agricultural research. Botanical.
 Bull. Indian Cent. Jute Cttee 1946 : 9 : p. 177.

The following investigations are briefly mentioned. A leaf shape mutant of jute is being studied, which is a simple recessive to the normal shape. Seeds have been treated with colchicine and sown in an attempt to produce tetraploids. Cytological studies of *Corchorus auxillaris* are in progress.

50. 633.523:575(54)
 633.523:575.116.1(54)
Progress of technical schemes. Agricultural research. Botanical.
 Bull. Indian Cent. Jute Cttee 1946 : 9 : p. 206.

The following work on jute is briefly reported. Investigation of the linkage relationships between the genes for branching habit, bitter taste and anthocyanin pigmentation has been completed. The genes for taste and branching habit are linked, with a crossing-over value of 24%. The three genes for pigmentation, C, A and R, were not found to be linked with the genes for taste and branching habit.

Germination of colchicine-treated seeds which had been previously soaked in water was poorer than that of seeds which had not been pre-soaked.

Selection work is mentioned. At Kishoreganj, multiple crossing work has been begun.

SUGAR PLANTS 633.6

51. 633.61:575(54)
What the scientists are doing. The 1946 batch of new Co. canes.
 Indian Fmg 1946 : 7 : p. 252.

A table gives the parentages and general characteristics of 11 new Co. canes, numbers Co. 634 to Co. 644 inclusive.

52. D....., H. H. 633.61-1.524:575(68)
New sugarcane varieties. Methods of introduction.
 S. Afr. Sug. J. 1946 : 30 : 343, 345.

The production of new sugar cane varieties in South Africa is discussed with reference to (1) the introduction of established varieties from other countries, (2) the importation of seed, (3) the problems of hybridization, and (4) the utilization of sports. Recently methods have been developed at the Mount Edgecombe Experiment Station by means of which locally produced seed can be obtained. The possible use of air transport to bring viable pollen from tropical to sub-tropical countries is also considered. At present the most promising method of producing varieties in South Africa appears to be the importation of seed for local germination and selection.

53. SINGH, S. B. 633.61-1.531.12(54)
Viable sugarcane seed produced in the United Provinces.
 Curr. Sci. 1946 : 15 : p. 253.

It is reported that viable sugar cane seed has been produced by the Co. 356 variety in a village situated 40 miles north-west of Basti. Germination of the fluff was very successful. A large number of the seedlings have now been planted in the field for a study of their growth behaviour.

54. COPP, L. G. L. 633.63.00.14(93.1)
Sugar-beet variety trials.
 N.Z. J. Sci. Tech. 1946 : 27 : Sect. A : 376-80.

Sugar beet varieties of the E type were found to be the most suitable for cultivation in New Zealand, in four years' varietal trials.

55. MOLEGODA, W. 633.66(54.8)
The Kitul palm.
 Trop. Agriculturist 1945 : 101 : 251-57.

The botanical characteristics and uses of the kitul palm (*Caryota urens*) are described. Its chief value lies in the sweet juice that can be tapped from it, known as *thelijje*.

56. CHANDRARATNA, M. F. and
 NANAYAKKARA, K. D. S. S. 633.682:582(54.8)
Studies in cassava. 1. A classification of races occurring in Ceylon (continued).
 Trop. Agriculturist 1945 : 101 : 214-22.

This paper concludes the classificatory notes on the cassava varieties of Ceylon (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1088).

STIMULANTS 633.7

57. MAYNE, W. W. 633.73:575.42(54)
Annual Report of the Coffee Scientific Officer, 1942-43.
 Bull. Mysore Coffee Exp. Sta. 1943 : No. 25 : Pp. 19.

The recording of the individual yields of approximately 2000 *Coffea robusta* trees was continued for the third year. A preliminary selection of twelve trees has been made on the basis of this recording. The study of the fruits and seeds of these selections has been begun. The preliminary results indicate the unreliable nature of ripe cherry yield as an index of the commercial productiveness of *C. robusta* types.

A statistical study of leaf size and shape was undertaken with a view to developing a suitable sampling technique to compare the leaf characters of *C. robusta* trees; this work is preliminary to the classification of *C. robusta* types in southern India.

Marked differences in the sequence of fruit losses between *C. robusta* and *C. arabica* were observed. In *C. arabica* periods of heavy fruit loss alternate with periods of less marked fruit drop; in *C. robusta* the losses are heavy during the early stages of fruit development and fall off more or less regularly with time. A highly significant correlation between the number of fruit on five typical crop branches, each with five to seven cropping nodes, and the total yield of tree was obtained in the case of *C. robusta*. The possible use of this correlation in selection is discussed.

58. MAYNE, W. W. 633.73:575.42(54)
Report of the U.P.A.S.I.* Coffee Scientific Officer, 1943-44.
 Bull. Mysore Coffee Exp. Sta. 1944 : No. 26 : Pp. 14.

The individual yield recording of *Coffea robusta* trees was continued for the fourth year. Yield data on the twelve trees selected during the previous year are given. It again appeared that cherry yield alone may be an unreliable index of commercial yield. A study of the number of beans in a given weight and of the proportions of peaberry to flat beans was also made.

* United Planters' Association of South India.

Wide variations in habit have been observed between different *C. robusta* selections; trees of both compact and open habit occur. High-yielding trees have shown an impoverished sucker production, and tend to produce numerous lateral branches with fan-like branching habit. No relationship could be established between leaf size and shape on the one hand and yielding capacity on the other.

Plantings have been made of open-pollinated seed of the trees selected in the previous season with a view to further study of this material. Continued study of fruit setting in *C. robusta* suggests that the size of the crop very largely depends upon the percentage fruit set. It is noted that the results of six years' similar study on *C. arabica* gave no evidence of a relationship between the size of the crop and percentage fruit set. The correlation between the number of fruit on five typical crop branches and the final yield of the tree was again found to be highly significant.

59. MAYNE, W. W. 633.73:575.42(54)
Report of the U.P.A.S.I. Coffee Scientific Officer, 1944-45.
 Bull. Mysore Coffee Exp. Sta. 1944 : No. 27 : Pp. 15.

The individual tree recording of *Coffea robusta* was continued for the fifth year. Yield data are given on the twelve trees selected during 1942-43; a further seven trees have been selected for detailed investigation. Under the highly unfavourable conditions of the year in question five of the twelve original selections have given yields exceeding the average yield by four to six times, while the yields of only two fall below the field average.

A significant positive correlation was noted in *C. robusta* between the number of leaves at blossoming and the number of flower buds on the branches examined; in *C. arabica* the correlation obtained was much lower. The correlation between number of buds and percentage fruit set was not significant in *C. robusta*; in *C. arabica*, however, these two characters show in general a negative correlation, i.e., the greater the bud number the lower the percentage fruit set. In general the relationship between percentage fruit set and yield is much closer in *C. robusta* than in *C. arabica*.

Studies on the inheritance of resistance to *Hemileia vastatrix* are being resumed.

The possibility of grafting hybrid stocks with selected material is under investigation.

60. 633.74:575(6)
**Annual Report of the West African Cacao Research Institute,
 Tafo, April, 1945 to March, 1946 : Pp. 58. (Mimeographed).**

Information is given on the different strains of the virus diseases of cacao in West Africa. The relative distributions of mild and virulent strains lend support to a theory that the latter have originated from the former, either by synthesis of two or more strains to form a virus complex or by mutation. During the past five years more than 500 selections have been made, mostly from healthy or apparently mildly diseased trees growing on devastated farms. Buddings have been tested for their reaction to the virulent strain A. About 20 clones, of which six appear to have outstanding resistance, are to be further studied. Of the 25 clonal selections made from Trinitario trees growing at Aburi, seven have continued to show conspicuous vigour in spite of being infected for 3-4 years. Selection is to be discontinued for the present; work is to be concentrated on the testing of promising clones. Certain seedlings in the progeny trials exhibit relative resistance to the capsid, *Distantiella Theobromae*, or the fungus *Calonectria*.

The study of cross-pollination, involving the inheritance of the axil spot, was continued. The insects chiefly responsible for cross-pollination have been identified as the midges, *Forcipomyia ingrami*, *F. ashantii* and *Lasiohelius litoraurea*.

61. HILLS, K. L. 633.75:575(94)
**The suitability of a number of varieties of opium poppy for the
 production of morphine from the ripe capsule.**
 J. Coun. Sci. Industr. Res. Aust. 1946 : 19 : 177-86.

Trials of 44 varieties of opium poppy have been carried out in New South Wales, Victoria and Western Australia. The varieties originated from several different countries. Information is given on the following characters: maturity, number and size of the capsules,

capsule dehiscence, plant height and lodging, frost resistance, susceptibility to X condition,* yield of morphine and percentage content of codeine. Variety No. 23 and No. 34 gave greater yields of morphine than the other varieties investigated. No. 23 produced relatively larger yields of raw material with a low morphine concentration; No. 34, however, gave smaller yields with a higher morphine content. An attempt has been made to combine several desirable characters in a single variety by hybridization; the preliminary results are described as encouraging.

MEDICINAL PLANTS 633.88

62. PANTULU, J. V. 633.88:576.312.35
Chromosome number of *Cassia fistula*.
 CURT. Sci. 1946 : 15 : p. 255.

The chromosome number of *C. fistula* L. was found to be $2n = 14$.

FRUITS AND NUTS 634

63. LESLIE, W. R. 634(71)
Variety notes on some tree fruits grown in prairie orchards.
 Fmrs' Bull. Canad. Dep. Agric. 1946 : No. 135 (Publ. No. 780) : Pp. 27.
 Brief descriptive notes are given on 241 fruit varieties, including apples, crab apples, pears, apricots, sand cherries, sour cherries, plums and plum hybrids.

64. VYVYAN, M. C. 634:581.143.2:577.17:016
Fruit fall and its control by synthetic growth substance.
 Imperial Bureau of Horticulture and Plantation Crops, East Malling
 1946 : 3s. 6d. Tech. Comm. No. 18 : Pp. 72.
 This review of literature on the occurrence and causes of fruit drop, and its control by synthetic growth substances, includes references to varietal differences in pre-harvest fruit drop, the development of the abscission layer, and response to growth substances.

65. MURRAY, H. R.,
 REID, R. J. M.,
 ROY, P. O. and
 BLAIR, D. S. 634.11(71)
Some new apple varieties.
 Rep. Pomol. Soc. Quebec 1944 : 12-15.
 Descriptive notes are given on 18 apple varieties.

66. POLLARD, A.,
 KIESER, M. E. and
 BRYAN, J. D. 634.11:577.16(42)
The apple as a source of vitamin C.
 Rep. Agric. Hort. Res. Sta., Long Ashton, Bristol 1945 : 200-02.
 The vitamin C values are given for a number of dessert, culinary and cider apple varieties. Certain of the cider and culinary varieties were found to be fairly good sources of vitamin C.

67. BARKER, B. T. P. and
 BURROUGHS, L. F. 634.11:581.6(42)
The production of cider fruit on bush trees. Vintage quality trials.
Progress report No. 2. 1943 crops.
 Rep. Agric. Hort. Res. Sta., Long Ashton, Bristol 1945 : 170-78.
 Juice analyses and cider tests are reported for the 1943 crop of several apple varieties grown in bush form.

*The main symptom of this condition is a purplish-brown discoloration and dying off in the heart of the plant during the early post-rosette stage. The cause is unknown.

68. BARKER, B. T. P. and
BURROUGHS, L. F. 634.11:581.6(42)
The production of cider fruit on bush trees. Vintage quality trials.
Progress report No. 3. 1944 crops.
Rep. Agric. Hort. Res. Sta., Long Ashton, Bristol 1945 : 178-84.
The results of the 1944 juice and cider trials of apple varieties grown in bush form are reviewed with special attention to seasonal factors, and with reference to the results of the previous varietal tests in 1942 and 1943.
69. CRANE, H. H. 634.11-1.524(42)
Some good American apples.
J.R. Hort. Soc. 1946 : 71 : 172-73.
Notes are given on the following American apple varieties: American Mother, Delicious, King of Tompkin's County, Ontario, Wealthy, and Wagener.
70. INGRAM, C. 634.2:582
The rock cherries. *Amygdalocerasus*.
Gdnrs' Chron. 1946 : 120 : 138-39, 150-51, 162, 174, 186.
Taxonomic descriptions are given of *Prunus* species belonging to the section *Amygdalocerasus* of the subgenus *Lithocerasus*. An account is included of the distribution of these species.
71. WET, A. F. DE 634.25:581.165.71(68)
A preliminary study of peach varieties on peach and plum roots.
Sci. Bull. Dep. Agric. S. Afr. 1941 : No. 226 : Pp. 19.
All the plum stocks included in the experiments were too incompatible with the peach varieties worked on them to be of any commercial use. Inter-stock and varietal differences in the degrees of incompatibility between the peach varieties and plum stocks were observed. The peach roots were better suited to the peach varieties studied than any of the plum stocks.
72. KUMAR, L. S. S.,
ABRAHAM, A. and
SRINIVASAN, V. K. 634.51:576.35:577.8
The cytology of *Carica papaya* Linn.
Indian J. Agric. Sci. 1945 : 15 : 242-53.
Cytological investigations of *C. pubescens*, *C. dodecaphylla*, and 21 types of *C. Papaya* collected from different parts of the tropics, are reported. In all cases the chromosome number was found to be $2n = 18$. No morphological differences between the chromosomes of the hermaphrodite, male or female types of *C. Papaya* were observed in a study of a single variety of this species, nor were any morphological chromosome differences found in the strictly dioecious species, *C. pubescens*. In male papaya, however, the precocious separation of one particular bivalent during early anaphase was observed.
73. JOSHI, A. C. 634.6-1.524(54)
A palm suitable for cultivation in India *Bactris utilis* Benth. et Hook. F.
Indian Fmg 1946 : 7 : 237-39.
An account is given of pejbaye (*B. utilis*), a palm with valuable fruits. The introduction of this palm as a courtyard tree in India is suggested.
74. ROUX, M. S. LE 634.835-2.112-1.521.6(68)
Sunscauld in table grapes.
Fmg. S. Afr. 1946 : 21 : 506-10.
Varietal differences in susceptibility to sunscauld are reported.

FORESTRY 634.9

75. MELVILLE, R. 634.972.8:582
Typification and variation in the smooth-leaved elm, *Ulmus carpinifolia* Gleditsch.
J. Linn. Soc. (Bot.) 1946 : 53 : 83-90.
An account is given of the elm species *U. carpinifolia* Gleditsch (= *U. campestris* L. pro

parte; = *U. glabra* Miller; = *U. nitens* Moench; = *U. foliacea* Gilibert) for which the author proposes an emended diagnosis. The variation in leaf morphology exhibited by the species is discussed.

VEGETABLES 635

76. THOMSON, C. L. and ROBB, O. J. 635.31:575.42(71)
Asparagus selections and certain cultural practices compared for yield, earliness and sex ratios.
 Sci. Agric. 1946 : 26 : 289-99.

Literature on asparagus breeding is reviewed. Strains selected from high-yielding female plants of the Mary Washington variety and a commercial strain of the same variety were tested for yield over a four-year period. The results indicate that progeny testing is valuable as a method of selection. The data obtained also suggest that a close relationship between early and total yields possibly exists.

77. OGILVIE, L. 635.52-2.411.4:576.16:631.521.6(42)
Downy mildew of lettuce: further investigations on strains of *Bremia Lactucae* occurring in England.
 Rep. Agric. Hort. Res. Sta., Long Ashton, Bristol 1945 : 147-50.

The differentiation of two strains of *B. Lactucae* occurring on the cultivated lettuce in England is reported. Data are given on the pathogenicity of the two strains to the wild lettuces and related species, and a number of cultivated varieties.

78. POLLARD, A., KIESER, M. E. and BRYAN, J. D. 635.64:581.192(42)
Factors influencing the composition of the tomato. A comparison of varieties and of indoor and outdoor culture.
 Rep. Agric. Hort. Res. Sta., Long Ashton, Bristol 1945 : 203-08.

The effect of glasshouse and outdoor cultivation upon the ascorbic acid, sugar, titratable acid and dry matter contents, pH value and fruit flavour was investigated in several commercial tomato varieties. Significant varietal differences in ascorbic acid, sugar and acid contents are reported.

79. VENKATARAMANI, K. S. 635.646:575.125(54)
Breeding brinjals (*Solanum melongena*) in Madras. I. Hybrid vigour in brinjals.
 Proc. Indian Acad. Sci. 1946 : 23 : Sect. B : 266-73.

Hybrid vigour was studied in detail in the cross Udipi ♀ x Raviya ♂. The F_1 seeds showed increased weight due to heavier embryos. The F_1 seeds also exhibited a slightly higher germination percentage than the parent varieties. The F_1 hybrids possessed the following characters of economic interest: (1) increased yield, (2) earliness of flowering and maturity, (3) tallness, (4) well-branched and widely spreading habit, and (5) soft fruits with attractive shape and colour, which had fewer seeds than the parental fruits and resembled the fruits of Raviya in being thornless.

80. WAGER, V. A. 635.646-2.3-1.521.6:575(68)
Egg-plants resistant to bacterial wilt.
 Fmg S. Afr. 1946 : 21 : 410-12.

The bacterial wilt resistant varieties of egg plant, Matale and Kopek, are briefly described. Crosses of these two varieties with the wilt immune variety Terong Gowok from Java, have been made in an attempt to breed a large-fruited wilt immune egg plant.

81. PHADNIS, B. A. 635.657:581.48:575.183.061.6
Xenia in cotyledon colour of gram (*Cicer arietinum*).
 Curr. Sci. 1946 : 15 : p. 256.

Preliminary data are given on a xenia effect in the cotyledon colour of *C. arietinum*.

Part II. Foreign

*STATISTICS 519

82. CRUMP, S. L. 519.24
The estimation of variance components in analysis of variance.
 Biometrics Bull. 1946 : 2 : 7-11.

A discussion is presented of the various modes of application of the analysis of variance, with special reference to its utility in estimating variance components.

83. DIJKVELD STOL, J. J. 519.24:631.421
 Het uitschakelen van systematische fouten bij proefvelden in vierkants-
 vorm. (**The elimination of systematic errors in rectangular
 experimental plots**).
 Landbouwk. Tijdschr., Wageningen 1942 : 54 : 185-202.

The author considers in a historical review various methods of controlling the effect of fertility trends on field experimental sites of rectangular shape. Among the British methods discussed are those of "Student" and Fisher. These are compared with various foreign designs including those by Mitcherlich and van Uven. The relative merits of these are discussed qualitatively, and a particular Latin square design is given in detail.

84. FINNEY, D. J. 519.24:631.421
Latin squares of the sixth order.
 Experientia, Basel 1946 : 2 : 404-05.

A discussion is presented of the various possible orthogonal partitions of the 6×6 Latin square.

85. VISSER, W. C. 519.24:631.421
 Over de bruikbaarheid van de grafisch- statistische bewerkingstechniek.
 (**On the applicability of the graphical and statistical method of
 treatment**).
 Landbouwk. Tijdschr., Wageningen 1942 : 54 : 403-16.

The author sets out general principles for mathematical and graphical treatment of relationships between experimental data. He advocates the use of elementary statistical methods which are speedy, clear and give due weight to main and subsidiary points. As an illustrative example he discusses in detail a technique consisting in the fitting of several single variable regressions to selected pairs of variables resulting in a nomogram relating all variables. Fitting is often by sight and not by least squares. H. O. H.

86. WELLENSIEK, S. J. 519.24:631.421:061(49.2)
 Een studiekkring voor proeftechniek. (**A study circle for the technique
 of field experiments**).
 Landbouwk. Tijdschr., Wageningen 1941 : 53 : p. 743.

It is suggested that a study circle should be formed as a section of the Nederlandsch Genootschap voor Landbouwwetenschap (The Dutch Society for Agricultural Science), if the response to this notice shows that there is a need for such an organization.

*BREEDING 575

87. GESCHER, N. V. 575:608.3
Protection of new products discovered by plant breeders.
 Int. Rev. Agric. 1946 : 37 : 1T-10T.

A survey is given of the problems entailed in the legal protection of new plant varieties. The methods of protection used in the different countries are discussed, and the international aspect of the problem is considered with reference to the suggestions made at the Congress of the International Association of Professional Plant Breeders for the Protection of Plant Discoveries (Assinse), held in 1939 shortly before the outbreak of war.

* General studies, see also individual crops.

88. GREW, E. S. 575:633(42)
Herencia y crianza de plantas. (**Heredity and breeding of plants**).
Rev. Inst. Defensa Café, Costa Rica 1946 : 16 : 421-24.

An appreciative account is given of the genetical and plant breeding achievements of the John Innes Horticultural Institution.

89. RIEHM. 575:633(43)
Biologische Reichsanstalt für Land- und Forstwirtschaft in Berlin-Dahlem. Wissenschaftlicher Jahresbericht 1940. (**State Biological Institute for Agricultural and Forestry Research in Berlin-Dahlem. Scientific Annual Report 1940**).
Mitt. biol. Reichsanst. Berl. 1941 : No. 65 : Pp. 110.

This report has been already noticed in *Plant Breeding Abstracts* (cf. Vol. XIV, Abst. 440). The following details are now available:—

Wheat

Varietal tests have brought to light three lines of bunt resistant winter wheat. Spring wheat varieties differ in their degree of resistance to *Chlorops taeniopus*. Differences have been observed in the reaction of wheat varieties to *Puccinia glumarum* when inoculated in the open air and in a greenhouse respectively.

Oats

Three lines have shown some degree of resistance to loose smut.

Rye

Varietal reaction to *Fusarium* has been studied.

Barley

Three winter barleys and three spring barleys have shown a tendency towards delayed germination. The reaction of barley varieties to *Puccinia glumarum* differs significantly according to whether the tests are made in the open air or under glass.

Lupin

Mildew resistant lupins have been crossed with sweet lupins. Some of the offspring were resistant but none were sweet.

Serradella

Tetraploid strains have been obtained by the use of colchicine. Varieties are being tested for resistance to anthracnose.

Potato

Frühnudel is a new medium early variety resistant to *Phytophthora infestans* biotype A, and producing a satisfactory tuber and starch yield. It originated from a BRA line. BRA 6/33 is a medium late line also resistant to *P. infestans* A, but although its tuber yield is high, its starch yield is not so high. The variety Erika has outstanding tuber and starch yields and is likewise resistant to *P. infestans* A.

Notes are included on the distribution of the various biotypes of *P. infestans*.

Back crosses of *Solanum demissum* x *S. tuberosum* hybrids have been made for the purpose of obtaining forms resistant to Colorado beetle. Investigations on wart disease include the development of resistant strains of potato by means of hybridization.

The mutability of virus X has been established. Varietal resistance to virus Y has been investigated, the varieties Altgold and Jubel proving most satisfactory in this respect. Varietal differences in the solanin content of potato tubers have been demonstrated.

Flax

The reaction of varieties to *Melampsora Lini* differs according to whether the plants are grown in the open air or in the greenhouse. Hybridization studies have shown that the resistance to rust of Ottawa 770B x Winona and Kenya C.I. 709 is conditioned by one gene only, while the resistance of Buck 2/34 and Weimar is determined polymerically.

Sugar beet

Two lines resistant to *Cercospora beticola* are reported.

Apple

Hybrids have been raised, involving in many cases wild species. Varietal differences in susceptibility to frost damage have been investigated.

Vine

Some stocks derived from Berlandieri x Riparia Kober have proved frost resistant. Varietal differences in frost resistance have been studied. Hybridization work has continued, involving American species.

The distribution of *Phylloxera* biotypes has been studied, and it has now been demonstrated that true immunity to this pest does exist and should be distinguished from mere resistance. The genetics of resistance to *Phylloxera* has been studied, also the relationship between susceptibility and the leaf anatomy of the host.

Maturation of the wood has been investigated in a series of F₁ Cinerea hybrids.

Elm

Artificial inoculation has failed to produce symptoms of Dutch elm disease in the variety Christine Buisman.

Douglas fir

Further studies have been made of the resistance of Douglas fir stands to *Phaeocryptopus Gauemanni*.

Cucumber

Five varieties have been found resistant to cucumber mosaic No. 1.

Soya bean

Varietal differences in susceptibility to the soya bean virus have been discovered.

90. ČERNOGOLOVIN, V. 575:633(47)
(At the Far Eastern Institute of Agriculture and Animal Husbandry).
Socialističeskoe Seljskoe Hozjaistvo (Socialistic Agriculture) Moscow
1945 : Nos 11-12 : 59-60.

In this very brief sketch of the breeding work carried out at the Institute, the production of three new varieties of soya bean, Amur Yellow 041, Amur Yellow 042 and Amur Green 0154, is reported; these varieties are particularly suited to the Habarovsk territory. Tomato and cucumber varieties resistant to virus and fungus diseases have also been bred. A large collection of fruit species and varieties has been made with a view to breeding fruit varieties for the Far Eastern regions.

91. ÅKERMAN, Å. 575:633(48.5)
Arbetsplan för Sveriges Utsädesförening för år 1946. (Plan of work
for the Swedish Seed Association for the year 1946).
Sverig. Utsädesfören. Tidskr. 1946 : 56 : 111-47.

This plan of work, which differs in some respects from previous ones, gives a full account of (1) the general organization and the distribution of the work in the main research institute and its eight branch stations and their various sub-stations; (2) variety testing and its relation to the whole breeding programme; (3) methods of work; and (4) the particular aims in the 1946 breeding programme relating to the various cereals (including interspecific hybridization), legumes (including sweet lupins), herbage plants, potatoes, root crops, fibre crops, cross-pollinated oil crops, poppies, sunflower, soya bean, maize and tobacco.

The plans for the work of the Chemical Division, the Cereal Laboratories and the Cytological Division are also described. X-ray mutants of barleys are to undergo yield trials, and the study of mutants obtained in wheats and oats is to proceed side by side with the induction of mutation in other crops.

The Control Division will continue its work on control of pedigree seed, including milling tests and other relevant enquiries.

The following successful new strains or varieties are mentioned in the course of the survey: Timothy 0812; and the drought resistant Hansa winter wheat, No. 01282 from the cross

Sol II x Standard, which has been handed over to the Allmänna Svenska Utsädesaktiebolaget for multiplication and is being used in hybridization.

92. LAMPRECHT, H. 575:633(48.5)
Ett framgångsrikt växtförädlingsarbete. (**Promising plant breeding operations**).
Weibulls III. Årsb. 1943 : 38 : 24-26.

The earlier work and achievements of the Weibullsholm Plant Breeding Institute are briefly noted, with a summary of some of the best known varieties of cereals bred by S. O. Berg. Most of these varieties have been noted in *Plant Breeding Abstracts* except some of his earlier varieties of different species of herbage grasses.

93. FRANDSEN, H. N. 575:633(48.9)
633.00.15(48.9)
Dansk Plantereforædlingsvirksomhed. (**Danish plant breeding work**).
Tidsskr. Landøkon. 1940 : No. 6 : 313-35.

The history, development and achievements of Danish plant breeders are outlined in detail with special reference to future requirements.

It is suggested that the Danish Academy for the Technical Sciences (Akademiet for de tekniske Videnskaber) should be approached on the need for a research institute to carry out investigations on important problems relating to plant breeding, e.g. the production of new crops and varieties, plant physiology and disease resistance, for which private concerns and individual breeders lack funds and equipment.

The successful breeding work recorded has already been reviewed in *Plant Breeding Abstracts* at various times from other sources.

94. Rapport Annuel 1939-1940. (Annual Report 1939-1940). 575:633(72.94)
Bull. Dep. Agric. Haiti 1939-40 : No. 27 : Pp. 185.

Sweet Potato

Descriptions are given of the following local varieties: Moudongue Morne, Etranger Miyor, St Fort Poté, Jaune Beurre (Yellow Butter), Graine Edmond and Coupé Son.

Cotton

Efforts have been made to breed earlier varieties in order to escape disease injury.

Groundnut

Elite lines are being selected.

95. Rapport Annuel 1940-1941-1941-1942. (Annual Report 1940-41-1941-42). 575:633(72.94)
Bull. Dep. Agric. Haiti 1940-1942 : No. 31 : Pp. 377.

Sweet potato

Tests of the varieties Graine Edmond, Moudongue Morne, Etranger Miyor, St Fort Poté, Patate Beurre, Zoreilles Rat and Tisé are reported.

Manioc

The possibility of selecting superior strains is envisaged.

Groundnut

Selection for high oil content continues. A table is presented showing the percentage oil content of selected strains.

Lima bean

Selection for reduced cyanide content is under way.

96. Rapport Annuel 1943-44. (Annual Report 1943-44). 575:633(72.94)
Bull. Dep. Agric. Haiti 1943-44 : No. 36 : Pp. 140.

Potato

The variety Hollandaise has proved suitable for the local conditions of Haiti, and also highly resistant to diseases.

Sweet potato

The following varieties adapted to the local conditions of Haiti have proved satisfactory: Cassé Zongles, Six Semaines (Six Weeks), Bambou Limbé, Graine Edmond, Etranger Miyor, Ti Modeste, Bois Debout, Tripotages, Gros Frisé, Cachiman, Petit Homme (Little Man), Dormi Colé, Belvine and St Fort Poté.

Cotton

Selection for high quality fibre is reported.

Groundnut

Elite forms have been selected from native varieties.

Egg plant

Florida High Bush has proved superior to local varieties, especially in respect of resistance to pests and diseases.

Lima bean

Breeding for a reduced content of hydrocyanic acid is in progress. Varieties with coloured seeds have proved bitter and have been discarded.

97.

575:633(72.95)

Report of the Federal Experiment Station in Puerto Rico, 1945.

U.S. Dep. Agric., Washington 1946: Pp. 62.

Bamboo

Susceptibility to the powder post beetle (*Dinoderus minutus*) decreased with increase in the age of the culms of *B. vulgaris* Schrad. and *B. Tulda*.

Manila grass

Short day conditions were found to be conducive to seed production in *Zoysia matrella*.

Cinchona

Seedling variation in several characters was studied in *C. Ledgeriana*. The main varietal characteristics appear to have fairly definite limits of variation. Hybrids between *C. Ledgeriana* and *C. pubescens* were also studied. The F_1 hybrid closely resembled the *C. pubescens* parent. In the F_2 , however, various characteristics of *C. Ledgeriana* were observed. The Philippine introduction, P.I. No. 143981, exhibits wide variation. It appears to be mainly a composite of several *C. Ledgeriana* progenies; in addition, 10–15% of the seedlings show evidence of hybridization with *C. pubescens*. A preliminary study of this introduction indicates that the most reliable character upon which to base hybridity is leaf width. Certain strains of *Cinchona* have shown some resistance to thrips.

Rubber

A breeding garden of *Hevea brasiliensis* is in the course of establishment.

Mangosteen

Germination percentage and seed weight are correlated.

Insecticides

An experiment to compare three varieties of *Derris elliptica*, Sarawak Creeping, Changi No. 3 (Rio Pedras clone) and St Croix, was completed (cf. Abst. 139). Data were also obtained indicating that row plots are statistically more efficient than square or rectangular plots. Various other experiments on *Derris* are reported.

Mammea americana L. was found to be less toxic than *Pyrethrum*.

Pyrethrum

Several species were tested for their value as mild insecticides; *Pachyrhizus erosus*, *P. palmatilobus*, *Aeschynomene sensitiva*, *Calopogonium coeruleum*, *Gliricidia sepium* and *Cassia alata* were among species tested.

98.

575:633(75.9)

Annual Report of the University of Florida Agricultural Experiment Station, for the fiscal year ending June 30, 1945: Pp. 229.**Maize**

The possibility of securing further improvement by crossing the best inbred lines and selecting new inbreds from these crosses is regarded as slight.

Sansevieria

Varietal testing and breeding work are being carried out.

Sugar cane

Breeding is in progress at the Everglades Station.

Tobacco

Breeding a flue-cured type resistant to root-knot nematode is in progress. In field and greenhouse tests *Nicotiana repanda* Willd. proved the only species with satisfactory resistance. Hybridization between *N. repanda* and the common flue-cured tobacco has been attempted. Hybrids of *N. repanda* and the cigar wrapper Rg. variety exhibit only a fair degree of root-knot resistance; crosses have been carried out between these hybrids and six flue-cured varieties.

Fruits

A few fruits of ilama (*Annona diversifolia*) were obtained by hand-pollination. Attempts to cross the cherimoya and ilama were unsuccessful.

Papaya breeding is in progress.

Mango tests are reported.

Peanut

Hybridization has been continued. The main objectives of breeding work are (1) an early maturing variety with a seed dormancy period similar to that of Florida Runner, and (2) a high-yielding peanut of the Florida Runner type, free from unsound seed. The hybrid strains Florida 230-118, Florida 231-51 (Dixie Runner), Florida 249-40, and Georgia 207-3 have been intercrossed in all possible combinations, to provide further material for selection.

Celery

Breeding is being carried out at the Everglades Station.

Water-melon

The new hybrids, 78-OB, 124-402-019 and 3-05-OBW, possess promising resistance to *Fusarium* wilt, and also give good yields. Breeding for resistance to anthracnose (*Colletotrichum lagenarium*) is also in progress.

Tomato

Breeding for resistance to *Fusarium Lycopersici* Sacc. is reported; several hybrid lines which possess the Pan America type of resistance are now in the F₅, F₆ and F₇ generations. Breeding for a combination of resistance to early blight, grey spot, mosaic and leaf mould is also being carried out. Lines have been tested for root-knot resistance. *Lycopersicon peruvianum* (L.) Mill., and hybrids between this species and *L. pimpinellifolium*, exhibit some resistance, but the hybrids are usually completely or nearly self-sterile.

Egg plant

Hybrids are being selected for resistance to *Phomopsis* blight.

Phaseolus

The Commodore, Florida Belle and Keystone varieties of snap bean have shown outstanding leaf hopper resistance.

Cowpea

Nos 18 and 19 exhibit promising nematode resistance.

99.

575:633(76.9)

58th Annual Report of the Agricultural Experiment Station of
the University of Kentucky, 1945 : Pp. 68.

Wheat

Selections made for resistance to both leaf and stem rust are under observation.

Oats

Winter oat selections from the cross Fulwin x Lee-Victoria were almost as hardy as the Fulwin, Forkeddeer and Tennex varieties. Promising selections of spring oats are to be further tested.

Maize

Hybrid production is reported. Indication was obtained that the resistance of inbred lines to corn borer attack is inherited by their single cross progeny.

Barley

Winter barleys showing considerable resistance to mildew, net blotch and loose smut are being used in hybridization work. Selections from a composite cross exhibit resistance to mildew and net blotch and excellent straw qualities, and are to be subjected to advanced testing.

Tobacco

Improvement of the *Fusarium* wilt resistant Ky 33 and Ky 34 burley varieties by hybridization is in progress. In breeding for mosaic resistance in both burley and dark tobaccos, no satisfactory variety carrying the Ambalema factor for resistance has been obtained. The *N* factor for mosaic resistance from *Nicotiana glutinosa* has been successfully introduced into several burley and dark fire-cured tobaccos and into One Sucker.

The highest yields of nicotine from green tobacco were again obtained from the *N. rustica* varieties Brasilia and Olson 68, which gave 246 and 220 pounds per acre, respectively. Two other *N. rustica* varieties with a more desirable growth habit than Brasilia and Olson 68, and one *N. rustica* x *N. Tabacum* hybrid yielded 200 pounds per acre. One of these *N. rustica* varieties, No. 43054, is considered to have commercial possibilities.

100.

575:633(77.7)

Report on agricultural research for the year ending June 30, 1945.

Rep. Ia Agric. Exp. Sta. 1945 : Pt. I : Pp. 355.

Genetics

The genetic basis of heterosis has been investigated in *Drosophila* (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 890 and Vol. XVI, Abst. 1149).

Statistics

The determination of the most efficient methods of sampling yields in experimental plots of wheat, oats, maize, hemp and soya bean was continued.

Wheat

Selections of the cross Iobred x Minhardi show promising disease resistance, yield and quality.

Oats

A detailed account is included of breeding work carried out at the Iowa Station during the last 40 years.

The new variety Clinton (C.I. 3971), developed from the cross D69 x Bond, is being increased for distribution in Iowa and other states (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 739). Benton (C.I. 3910), another variety selected from the cross D69 x Bond, is being increased for distribution by the Indiana Experiment Station. Benton is a tall, stiff-strawed, high-yielding oat, resistant to smut and rust and similar to Clinton; it has been less resistant, however, to halo blight and *Helminthosporium*.

Among the promising new hybrids under test, those which combine crown rust and smut resistance derived from Bond and Victoria with the stem rust resistance derived from Hajira x Joannette and Victoria x (Hajira x Banner) are the most outstanding. As a group, Bond hybrid selections were superior in replicated yield experiments, particularly the D69 x Bond selections.

Barley

Several new strains have been selected from crosses of standard varieties with Peatland and Chevron. They are smooth-awned, stem rust resistant, and at least equal in yield to the better parent.

Varieties and selections were tested for reaction to *Pythium graminicola*, *Helminthosporium sativum* and *Erysiphe graminis*. Certain unnamed selections from crosses of Wisconsin 38 x Chevron, Velvet x Peatland and Glabron x Peatland were the most resistant to *H. sativum*; Manchuria (C.I. 4447) and certain other Manchuria strains were among the most resistant named varieties.

Forage grasses

In work on *Bromus inermis*, the chromosome number of the F_1 of a cross between a short, fine-stemmed pasture type and a tall erect hay type—in both of which the somatic chromosome number was $2n = 56$ instead of the usual $2n = 42$ —was examined, and found to be the same as that of the parents. In most of the cells studied, lagging of one pair of chromosomes was observed. Inbreeding of *B. inermis* was continued.

The development of a synthetic variety of reed canarygrass (*Phalaris arundinacea*) is in progress. Single plant selections that appear to have reduced seed-shattering are under observation.

In general the yields of F_1 crosses of *Dactylis glomerata* were positively and significantly correlated with top-cross yields. The effects of inbreeding and the value of inbreeding in utilizing hybrid vigour are under investigation.

The carotenoid pigment content of parental clones and the hybrids between them were found to be significantly related, suggesting the possibility of breeding for higher vitamin C content.

Individual plant selection has been carried out in *Poa pratensis* for the purpose of studying yield performance and breeding behaviour.

Leguminous forage plants

Breeding for low coumarin content in *Melilotus* is in progress. The material under investigation includes hybrids between *M. alba* and *M. dentata*. Fertility and autopolyploidy are also being studied in sweet clover.

Lucerne improvement work is reported. Low crown pasture types are to be studied for bacterial wilt resistance and seed-setting.

Polycross progenies derived from selected lines of Emerson red clover were selected for further breeding on the basis of forage yield and recovery.

White clover strains have been crossed in the attempt to combine several desirable characters.

The early, disease resistant selections of Korean lespedeza, L-6 and L-39, are to be released. L-81, is to be released for increase and distribution in Missouri.

Selection of birdsfoot trefoil (*Lotus corniculatus*) is reported.

Hemp

Breeding work is reported.

Apple

A historical survey is given of the breeding programme at the Iowa Station.

Plum

Data are given on the pollination behaviour of promising interspecific hybrids.

Peach

Breeding for hardiness continues.

Rubus

In breeding anthracnose resistant black raspberries, *R. parvifolium*, *R. coreanus* and *R. rusticanus* PI-131870 are being used in crosses with standard and seedling varieties of red, black and purple raspberries. F_2 seedlings of the cross between *R. parvifolium* and the red raspberry are being grown; some of the seedlings show improvements in hardiness and fruit characters. These seedlings are to be back-crossed to standard red and black raspberry varieties.

Water melon

The varieties Early Resistant Queen, Black Kleckley, Kleckley Hybrid, and Dixie Hybrid were released in 1944 (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 1308).

Tomato

Polyploidy is being investigated.

Onion

By selection of inbred lines of Yellow Sweet Spanish it is hoped to secure lines with improved seed-setting capacity. F_1 crosses between White Persian and Scott County Globe were selected for glossy, thrips resistant foliage.

Soya bean

Selection of crosses involving Richland is in progress. A strain selected from Mukden x Richland shows particular promise. Pedigree selection is also reported. The back-cross of Lincoln x (Lincoln x Richland) is being selected to obtain strains combining the lodging resistance of Richland with the yield, plant height and high oil content of Lincoln.

101.

575:633(96.9)

Shaping the future of Hawaii's agriculture.

Rep. Univ. Hawaii Agric. Exp. Sta. 1944 (1945) : Pp. 115.

Maize

Varietal tests are reported. The Mayorbello variety gave the highest yields.

Napier grass

Improvement work is reported.

Pigeon pea

Selection of the pigeon pea as a grazing crop is in progress.

Sweet potato

Trials are reported.

Capsicum

Large Early Neapolitan, a sweet pepper variety with medium sized fruits, was outstanding for the number of fruit set. This variety was crossed with larger fruited types in the attempt to obtain improvements in fruit setting capacity and other characters.

Fruits

The classification and description of avocado varieties have continued, special attention being given to the season of maturity and pollination cycle.

Superior inbred lines of the Solo papaya have been developed, which may be used in the hybridization programme. Selections of a Florida x Solo hybrid back-crossed to Solo appear to be promising with regard to low bearing, earliness and fruit shape. A line derived from a Solo x Wild Panama hybrid back-crossed to Solo has yielded fruits which, although small, have unusually good colour and flavour in a locality where these characters are usually impaired by environmental factors.

Investigations on the genetics and physiology of carpelloidly in the stamens are in progress. Litchi varietal tests are reported. The Kwai Mi, Hak Ip, Wai Chi and Pak Lap Lai Chi are the only varieties which have produced fruits in Hawaii.

Nuts

Selection of the *Macadamia* nut is being carried out.

Tomato

F₃ hybrids of a cross between Michigan State Forcing and *L. peruvianum* have shown promising nematode tolerance; their resistance may possibly be associated with the vigorous development of their root systems.

The back-cross of the hybrid *L. hirsutum* x *L. esculentum* to *L. esculentum* was most successful when the hybrid was used as the female parent; a number of viable embryos were grown on nutrient agar.

The production of the new spotted wilt resistant variety HES 657 is reported. This variety has since been named Pearl Harbor (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 986).

Selections from the crosses Bounty x Oxheart and (Bounty x Oxheart) x HES 657 show improvements in fruit characters in comparison with the Bounty variety.

Certain complex crosses involving four or more varieties and lines have given high yields. HES 1199, an F₁ plant from the cross (Pritchard x Valiant) x (Bounty x Oxheart), was outstanding for its high yield.

Resistance to the strain of spotted wilt investigated was inherited as a simple Mendelian dominant character.

Crosses involving the small-fruited lines, T.R. 42-8, T.R. 42-19 and P.I. 79532, have yielded selections resistant to grey leaf spot (*Stemphylium Solani*). *Stemphylium* resistant plants were also obtained from crosses involving *L. esculentum*, *L. pimpinellifolium* and *L. peruvianum*; crosses have been made between these selections and commercial varieties.

Breeding for combined resistance to spotted wilt, *Fusarium* and *Stemphylium* is in progress. The possible use of F_1 hybrids combining resistance to at least two diseases is receiving attention.

Egg plant

In a varietal test of resistance to *Phytomonas solanacearum*, the local variety Molokai Long, and the Puerto Rican varieties Blanco, Rosita and Puerto Rican Beauty exhibited considerable resistance.

Beans

Breeding for improved quality and resistance to *Uromyces appendiculatus* is in progress.

Sweet corn

Inbred lines derived from crosses between tropical maize of various types and USDA 34 are being selected for tenderness of pericarp and resistance to mosaic and ear worm.

102. GROENEWOLT, J. K. 575:633:007(49.2)

Ter inleiding. (**Introduction**).

Zesde Jaarboekje Nationaal Comité voor Brouwergerst, Wageningen 1941 : 5-9.

This introduction consists largely of an appreciation of the late Professor C. Broekema and his work in promoting plant improvement and the production of new varieties, and protection of growers. His part in the foundation of NaCoBrouw, the Association for the Promotion of Malting Barley Cultivation in Holland is described.

103. FRANCK, W. J. 575:633:608.3(49.2)

Bescherming van kweekersrechten. Opbrengstvermeerdering door het gebruik van gekeurd zaaizaad. (**The protection of growers' rights.**

Increasing the yield by the use of inspected seed).

Landbouwk. Tijdschr., Wageningen 1942 : 54 : 125-39.

A comprehensive survey and discussion of the whole problem of protection of growers' rights, etc. is presented, with particular reference to Holland. The existing system of variety registration and inspection is explained.

*GENETICS 575.1

104. GARBOE, A. 575.1

Fra Arvelighedsforskningens Udviklingsgang. (**On the origins and development of genetic research**).

Nat. Verd. Kbh. 1941 : 24 : 424-28.

A concise outline of the history of research on heredity and genetics from its beginning to the present time is given, with an estimate of the value of the contributions of various scientists from Mendel to Haldane.

105. GOLDSCHMIDT, R. B. 575.1

Position effect and the theory of the corpuscular gene.

Experientia, Basel 1946 : 2 : 197-203, 250-56.

A useful and comprehensive review is given of the author's genetical theory and the respects in which it differs from neo-Darwinism. Detailed descriptions are given of the various types of position effect already reported, and emphasis is laid upon the many similarities between the effects due to translocation and those due to so-called point mutations. The classical theory of the gene is subjected to criticism on diverse grounds, and in its place the author develops his own theory of the chromosome as a giant molecule. It is shown that most of the genetical phenomena known can be interpreted as consequent on rearrangements of various magnitudes in the architecture of the chromosome.

106. BLANC, R. 575.115:575.113.5

Dominigenes of the vestigial series in *Drosophila melanogaster*.

Genetics 1946 : 31 : 395-420.

Dominance modifiers or "dominigenes" were found to have an ubiquitous chromosomal distribution. The modifiers were either with or without visible specific effect upon the phenotype. In view of this result, Gardner's conclusion regarding the modifying action

* General studies, see also individual crops.

of a number of point mutants, and Mather's distinction between polygenes and oligogenes (cf. *Plant Breeding Abstracts*, Vol. XII, Abst. 647) are disputed. The author presents the hypothesis that dominance modifiers may act by influencing the time relationships of developmental processes. If this hypothesis is valid, many examples of pleiotropism may be explained as a special case of the action of modifiers.

107. MICHAELIS, P. 575.127.2:575.182:575.17
Über reziprok verschiedene Sippenbastarde bei *Epilobium hirsutum*. VI. In welcher Weise sind an der Manifestation der im Jena-Plasma auftretenden Entwicklungstendenz die Gene dieser Sippe beteiligt? (**On reciprocally different racial hybrids in *E. hirsutum*. VI. What part have the genes of this race in the manifestation of the developmental tendency occurring in Jena plasma?**)
Z. indukt. Abstamm.- u. VererbLehre 1941 : 80 : 454-99.

A series of experiments was made to find the relation between plasmon of the *E. hirsutum* race from Jena and the genomes of many other races and species. In this paper the effect of the genome of the plasma of the Jena race is studied. Results showed that the type of the developmental tendencies of all plants with Jena plasma is determined by the plasmon, but the degree of manifestation of these tendencies is quantitatively affected by the total reaction of all the genes. The genes of the Jena race do not differ fundamentally from those of other races and species and, in their relation to the plasmon, are replaceable by other genes. Developmental disturbances of the most varied degree occur, when the action of all the genes exceeds the fixed reaction threshold characteristic of the Jena plasma.
E. W.

108. BRAUN, W. 575.17
Some thoughts on "gene action".
Science 1946 : 104 : p. 38.

Recent work is quoted in favour of the theory that the desoxyribose nucleic acid of the chromosomes acts on the metabolism of the cell by inhibiting enzyme processes rather than catalyzing them. If this suggestion is true, the extra-chromosomal constituents of the cell would be of greater significance in mutation studies than has been previously thought.

109. MICHAELIS, P. and
DELLINGSHAUSEN, M. v. 575.182:575.17:575.12
Über reziprok verschiedene Sippenbastarde bei *Epilobium hirsutum*. IV. Weitere Untersuchungen über die genischen Grundlagen der extrem stark gestörten Bastarde der *E. hirsutum*-Sippe Jena. (**On reciprocally different racial hybrids in *E. hirsutum*. IV. Further research on the genetic basis of extremely aberrant hybrids of *E. hirsutum* of the Jena race).**)
Z. indukt. Abstamm.- u. VererbLehre 1942 : 80 : 373-428.

The experiments described were made to analyse the plasmatic inheritance and interaction of plasmon and genome in *E. hirsutum*. Explaining the results in accord with Corren's hypothesis, the authors hold that the genes do not transform the plasma in conformity with their nature, but that in the plasma the actual developmental processes occur. The role of the genes of the chromosome complement is limited to the production of quantitative alterations.
E. W.

110. Ross, H. 575.182:575.17:575.12
Über die Verschiedenheiten des dissimilatorischen Stoffwechsels in reziproken *Epilobium*-Bastarden und die physiologisch-genetische Ursache der reziproken Unterschiede. I. Die Aktivität der Peroxydase in reziproken *Epilobium* Bastarden mit der Sippe Jena. (**On catabolic differences in reciprocal *Epilobium* hybrids and the physiological and genetic causes of the reciprocal differences. I. The activity of peroxidase in reciprocal hybrids with the Jena race).**)
Z. indukt. Abstamm.-u. VererbLehre 1941 : 79 : 503-29.

The existence of bearers of inheritance has already been proved. How they act and the

nature of their physical basis are problems related to the study of the plasmon. The activity of the oxidation ferments are here investigated.

The physiological connexion between genetic induction and the resultant morphological character is a reaction chain, originating in interaction between the genome, plasmon and plastid system and the environmental factors.

The plasmon in the Jena race of *E. hirsutum* differs essentially from that of most other *hirsutum* races. The differences between the reciprocal crosses of the Jena race with other *hirsutum* races depend on variation in the control of certain reaction chains under the influence of plasmon differences; moreover, gene differences of the male parent's race also affect the reaction chain, hence the production of the markedly inhibited hybrids of the Jena series. Ten metabolic alterations in this inhibited Jena series are enumerated. From the experiments, it is postulated that Jena plasmon with sensitive genes may effect changes in catabolic activity. Later results showed that an exact parallel exists between the peroxidase activity and the degree of inhibition, both as regards amount and direction.

E. W.

111. MICHAELIS, P. 575.182:575.17:575.127.2

Über reziprok verschiedene Sippenbastarde bei *Epilobium hirsutum*. V. Über die Bedeutung der Genquantität für die Manifestation reziproker Unterschiede. (On reciprocally different racial hybrids in *E. hirsutum*. V. On the quantitative significance of the genes in the manifestation of reciprocal differences).

Z. indukt. Abstamm.- u. VererbLehre 1942 : 80 : 429-53.

A triploid *E. hirsutum* x *E. luteum* hybrid, having one genome of *E. luteum* and two genomes of *E. hirsutum*, is described. Developmental disturbances in the progeny of this hybrid are most marked in those progeny resembling the hybrid and decrease according to the degree to which the plants resemble either of the parents. These developmental disturbances characteristic of the Jena race seem to be due to the reaction chains, induced by genes native or foreign to the plasma being disturbed or compensated.

E. W.

VARIATIONS, MODIFICATIONS, MUTATIONS 575.2

112. KAUFMANN, B. P. and
HOLLAENDER, A. 575.243:537.531:535.61-31

Modification of the frequency of chromosomal rearrangements induced by X-rays in *Drosophila*. II. Use of ultra-violet radiation.

Genetics 1946 : 31 : 368-76.

Treatment of the spermatozoa of *Drosophila melanogaster* with ultra-violet radiation of wave length 2537Å subsequent to X-ray treatment resulted in a decrease in the frequency of chromosomal rearrangements, as shown by analysis of the female salivary gland chromosomes. Data were obtained suggesting that this reduction is attributable to increased restitution rather than to an increase in the relative frequency of single breaks.

113. KAUFMANN, B. P.,
HOLLAENDER, A. and
GAY, H. 575.243:537.531:537.61-15

Modification of the frequency of chromosomal rearrangements induced by X-rays in *Drosophila*. I. Use of near infrared radiation.

Genetics 1946 : 31 : 349-67.

Analysis of the salivary gland chromosomes of *Drosophila melanogaster* showed that pre-treatment with near infra-red radiation resulted in an increase in the frequency of detectable chromosome rearrangements induced by X-ray treatment. The various possible modes of action of the near infra-red treatment in sensitizing the chromosomes to X-rays are discussed.

114. WELLENSIEK, S. J. 575.243:581.04
 Het kunstmatig verwekken van mutaties met colchicine. (**The artificial induction of mutations with colchicine**).
 Landbouwk. Tijdschr., Wageningen 1941 : 53 : 535-43.

This is a documented note on the subject treated from the following aspects: history of the technique; properties of colchicine; methods of colchicine treatment of higher plants and the effects obtained; some special cases, including chromosome doubling in various crop plants; other effects of colchicine; and other substances with similar action.

ADAPTATION 575.3

115. WELLENSIEK, S. J. 575.3:575.1
 Het streven naar geluk. (**The search for happiness**).
 H. Veenman and Zonen, Wageningen 1946 : Pp. 14.

The genetic principles which govern the ultimate emergence or production of superior individuals in the plant world are examined with special reference to the importance of harmonious interaction between the individual genotype (idiotype) and its environment in producing the best forms possible.

The argument is thought to be applicable also to man.

SELECTION 575.4

116. 575.4
 575.1
 575.2:576.12
 Sizov, I. A.
 (**A great theorist of our time**).
 Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 4-11.

An appreciation is presented of the work of Timirjazev on the 20th anniversary of his death.

*CYTOLOGY 576.3

117. DODSON, E. O. 576.312.32:581.192
 Some evidence for the specificity of the Feulgen reaction.
 Stain Tech. 1946 : 21 : 103-05.

The criticism by Carr of the specificity of the Feulgen reaction (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 21) has been examined experimentally. No evidence was obtained in support of Carr's criticisms that the chromosomes are adsorbents capable of regenerating the colour of the Schiff reagent, or that selectivity of the Feulgen reagent for the nucleus depends upon the destruction of the cytoplasm by the acid hydrolysis preceding treatment.

118. PROKOFYEVA-BELGOVSKAYA, A. A. 576.312.34
 (**Heterochromatization as a change in the chromosome cycle**).
 Žurnal Obščei Biologii (Journal of General Biology) 1945 : 6 : 93-124.

In this review of the subject it is pointed out that though there is evidence that the chromosome is comprised of inert (heterochromatic) and active (euchromatic) regions, there is also evidence that the same chromosome or part of a chromosome may behave heterochromatically under one set of conditions and euchromatically under a different set. Experiments have shown that when an inert region is brought by inversion to lie between two active regions, if it is a small piece, it becomes indistinguishable from any normal euchromatic region. The converse phenomenon has also been observed. Heterochromatization would therefore seem to be a physiological condition in which any part of a chromosome may find itself, conditions being appropriate. Very numerous observations have shown that the percentage of heterochromatization is constant for a given line under the same environmental conditions; it differs however in males and females, and in reciprocal

* General studies, see also individual crops.

crosses, it is reduced by the presence of supernumerary Y chromosomes and increased by age and by propinquity to the centromere; it is reduced by abnormal temperatures, high or low. The condition of the chromosomes is thus influenced by a number of factors, and this is seen in mosaic tissues, where they become active or inert according to conditions which vary from cell to cell. An examination of much of the author's own data and data from the literature has shown that the influence of the various factors on heterochromatization is parallel to their effect on crossing-over, a reduction of the conjugation rate and crossing-over percentage being brought about by the same factors that cause increased heterochromatization.

The euchromatic condition is regarded as the normal, and the heterochromatic condition as a reaction of the more sensitive part of the chromosome to changed conditions within the cell. When a chromosome or part of a chromosome becomes completely heterochromatic, its genes become inactive and recessive; this occurs in certain mosaic tissues in *Drosophila*, where the type of mosaic has been found to be hereditarily correlated with the behaviour of a particular heterochromatic region. It is pointed out that heterochromatization constitutes merely one change in the natural cycle of the chromosomes, a change which brings the chromosomes towards the mitotic stage and consists of a speeding up of certain metabolic processes. Many recessive mutations are thought to be the result also of such a slight speeding up, a view which is regarded as consonant with Goldschmidt's conception of mutation as a change in the rate of certain reactions.

119. KAPLAN, R. 576.312.34:575.24
Zur Frage der physikochemischen Struktur des Chromosoms. (**The question of the physico-chemical structure of the chromosome**).
Naturwissenschaften 1940: 28: 79-80.

A detailed consideration is given to the question of the physical constitution of the chromosomes. Particular emphasis is laid on the energy relationships of thymonucleic acid, a subject which is discussed with special reference to X-ray induced mutations and chromosome breaks.

120. CASTRONOVO, A. 576.312.35
Estudio cariológico de doce especies de Leguminosas argentinas.
(**Caryological study of twelve species of Argentine Leguminosae**).
Darwiniana, B. Aires 1945: 7: 38-57.

Details are given on the metaphase chromosomal configurations of the following species: *Gleditsia amorphoides* (Griseb.) Taub., $2n = 28$; *Acacia Cavenia* (Mol.) H. et A., $2n = 26, 52$; *Acacia bonariensis* Gill $2n = 26, 52$; *Acacia Aroma* Gill., $2n = 26, 52$; *Prosopis striata* Benth., $2n = 28, 56$, c. 112; *Sesbania marginata*, $2n = 12$; *Adesmia bicolor* (Poir.) DC., $2n = 20$; *Adesmia incana* Vogel., $2n = 40$; *Adesmia pinifolia* Gill., $2n = 20$; *Adesmia trijuga* Gill., $2n = 20$; *Adesmia macrostachya* Benth., $2n = 20$ and *Adesmia* sp., $2n = 20, 40$. In those cases in which two or three chromosome numbers are given for a single plant, these refer to different cells of the same plants.

121. KOSTOV, D. 576.356:539.185.9
576.356:537.531
(**Chromosome changes obtained by treatment with neutrons**).
Med. Fakultät, Sofia 1943-1944: 23: 51-61.

Using seed of *Crepis capillaris* from Rumania, Hungary and the U.S.S.R., a study was made of the cytological effects resulting from neutron-treated plants. The latter were very backward; many seeds germinated but ultimately died. Possibly penetration of neutrons is impeded by the integument. Over 70% of the bombarded cells showed changes, most frequently, fragmentations and translocations affecting the A, C and D chromosomes in various ways, which are described in detail. The effects on the satellites and centromeres, and on chromosome association are also recorded.

In many adult plants all the root tips examined showed altered karyotypes, indicating that the plants to which they belonged were karyotypic chimaereas. Chimerical root tips were rare. Translocations and inversions were also discovered.

122. CAMARA, A. and VASCONCELOS, S. 576.356.1:581.04
 Não-disjunção provocada artificialmente com anidrido carbónico.
 (Non-disjunction induced artificially with carbon dioxide).
 Brotéria 1945 : 14 : 188-95.

Carbon dioxide has been shown to increase the incidence of non-disjunction in *Drosophila*. It is hoped that it may prove efficacious also with plants.

123. DUBININ, N. P. and TINIakov, G. G. 576.356.2:575.41(47)
 Structural variability of chromosomes in urban and rural populations.

C.R. (Doklady) Acad. Sci. U.R.S.S. 1946 : 51 : 155-57.

An account is given of differences in inversion frequencies between urban and rural populations of *Drosophila*, which have arisen as the result of natural selection.

124. HAVAS, L. J. 576.356.5:581.04
 A colchicin biológiai és gazdasági jelentősége. (The biological and economic significance of colchicine).
 Mag. Technika 1946 : 1 : 1-6.

A short and comprehensive review is given of colchicine studies. In the discussion of its biological significance, special stress is laid on its c-mitotic action and upon the connexion between such studies and work on hormones and cancer. Finally its importance as an agent in improving existing species and producing new varieties through the induction of polyploidy is pointed out. E. E.

EXPERIMENTAL TECHNIQUE 578

125. RAFALKO, J. S. 578.6
 A modified Feulgen technic for small and diffuse chromatin elements.
 Stain Tech. 1946 : 21 : 91-93.

A revision of the Feulgen technique is presented. By its use, positive reactions have been obtained with smear preparations unresponsive to the standard method. The material to which this modification has been successfully applied includes *Saccharomyces cerevisiae* and *S. carlsbergensis*. Direct charging of both the basic fuchsin solution and the rinsing water bath with sulphur dioxide gas is suggested instead of the use of hydrochloric acid.

126. WARMKE, H. E. 578.6
 Precooling combined with chrom-osmo-acetic fixation in studies of somatic chromosomes in plants.
 Stain Tech. 1946 : 21 : 87-89.

A technique is described by means of which the chromosomes in root tip preparations are shortened and the details of chromosome structure are satisfactorily preserved. Excised roots are placed in vials partially filled with water at 0° C. for 1½ hours, at the end of which period the water is replaced by Benda fluid, also cooled to 0° C.

127. McKAY, H. H. 578.6:635.25
 The use of enzymes in the preparation of root-tip smears.
 Stain Tech. 1946 : 21 : 111-14.

A simple method of making root-tip smear preparations for the study of the somatic chromosomes of *Allium* is described. An aqueous solution of colchicine and Pectinol, an enzymatic preparation derived from *Aspergillus*, are used.

128. KRAFT, M. M. 578.65:581.331.2
 Etude critique des colorations en histologie végétale. (Critical study of stains in plant histology).
 Mém. No. 48 Soc. Vaud. Sci. Nat. 1943 : 7 : 91-165.
 [Contained in Trav. Inst. Bot., Lausanne 1940-1944 : 3].

Details are given of methods of fixing, staining and mounting plant material. Special attention is paid to pollen grains and the bryophytes.

*BOTANY 58

129. ERNST, H. 581.143.26.035.1:576.356.5
Die photoperiodische Reaktion bei autetraploidem *Antirrhinum majus* L.
(**The photoperiodic reaction in autotetraploid *A. majus* L.**)
Ber. dtsch. bot. Ges. 1941 : 59 : 351-55.

Marked retardation in development observed in tetraploids of race 50 of *A. majus* as compared with the diploid was shown to be due to short day illumination. The neutral photoperiodic reaction characteristic of race 50 evidently gave place to a pronounced long day type of reaction. E. W.

130. GARDNER, V. R. and
BATEN, W. D. 581.165.1:575.25
Studies in the nature of the clonal variety. II. Selection within a periclinal chimera.

Tech. Bull. Mich. Agric. Exp. Sta. 1942 : No. 179 : Pp. 48.

Considerable variations in leaf colour distribution, leaf size and other plant characters were observed in vegetatively propagated progenies of the Madame Salleron variety of *Pelargonium zonale*, an albo-marginate periclinal chimaera. Some of the variations were maintained in successive vegetative generations. The concept of a clonal variety is discussed in the light of the observed variability.

131. WEATHERBY, C. A. 582
Changes in botanical names.
Amer. Midl. Nat. 1946 : 35 : 795-96.

In connexion with the general problem of establishing fixed botanical names, nomenclatural changes are analysed under the following heads: (1) cases in which an earlier and different name for species is discovered, (2) the case of homonyms, and (3) instances involving the application of the "type method".

132. WEEVERS, T. 582:581.192
The relation between taxonomy and chemistry of plants.
Blumea, Leiden 1943 : 5 : 412-22.

The taxonomic value of the biochemical composition of plants is discussed with special reference to the theories of Ivanov, Mez and McNair (cf. *Plant Breeding Abstracts*, Vol. V, Abst. 930). In particular, the author stresses that specific combinations of chemical substances may be valuable indicators of systematic affinity.

*DISEASES AND INJURIES, BACTERIA, FUNGI 632

133. SEEMANN, J. 632.111-1.521.6:581.036:578.08
Über die Temperaturverhältnisse in einem bewetteten Tiefkühlgewächshaus. (**Temperature conditions in a climatically controlled low temperature greenhouse**).
Gartenbauwiss. 1942 : 17 : 186-92.

Artificially controlled low temperature weather conditions in greenhouses, especially important for work on frost resistance, are fully described. E. W.

134. MASTENBROEK, C. and
OORT, A. J. P. 632.421.9:576.16:633.1/3(49.2)
Het voorkomen van moederkoren (*Claviceps*) op granen en grassen en de specialisatie van de moederkorenschimmel. [**The occurrence of ergot (*Claviceps*) on cereals and grasses, and the physiological specialization of the ergot fungus**].
Tijdschr. PlZiekt. 1941 : 47 : 165-85.

Investigations during the summer of 1940 showed the very common occurrence of ergot (*Claviceps* spp.) on cereals and grasses in the neighbourhood of Wageningen and in parts of the provinces of Gelderland and North Brabant. Besides cereals, *C. purpurea* was found on 19 spp. of Gramineae. *C. Wilsoni* appeared to be common on *Glyceria fluitans*;

* General studies, see also individual crops.

this is the first record of this species in the Netherlands, but an examination of herbarium material showed that it had been collected there several times under the name of *C. purpurea*.

Inoculation experiments were made with a Dutch, a Polish, a Spanish and a Canadian strain of *C. purpurea* from rye, and three Dutch strains from *Festuca arundinacea*, *Lolium perenne* and *Bromus erectus*, respectively. The results indicated that the three European strains from rye are apparently identical with Barger's physiological form p_1 , whilst the three strains from the grasses belong to a new form p_4 which was conclusively shown not to be a mixture of forms p_1 and p_3 . The fact observed both by the authors and by Stäger, that stands of rye and *Lolium* growing close together are found at times to be heavily attacked by ergot, gives rise to the question of whether the new form p_4 can occasionally infect rye; work is in hand to solve this problem, since this form has not yet been isolated from rye either by the authors or Stäger.

V. A.

135. HOROWITZ, N. H.,
HOULAHAN, M. B.,
HUNGATE, M. G. and
WRIGHT, B.

632.421.9:581.04:575.243

Mustard gas mutations in *Neurospora*.

Science 1946 : 104 : 233-34.

Numerous visible and biochemical mutants have been obtained by subjecting *Neurospora crassa* to the action of mustard gas.

136. PROSTOSERDOV, N. N.
(Soviet sherry).

632.422.3-1.524:577.15(47)

Priroda (Nature) 1946 : No. 3 : 29-37.

The yeast which forms a surface crust during the manufacture of sherry in Spain was introduced into the Crimea in 1908. The manufacture in Russia of a wine possessing all the attributes of sherry was made possible by a study of this yeast. The varieties of grape used were Sersial, Pedro, Albillo, Palomino, Mantuo, Castelliano and others.

In 1927, it was found that *Saccharomyces cheresiensis* var. *armeniensis* was used in Armenia for the manufacture of wines closely resembling true sherry. Isolated strains of this yeast were used in the manufacture of sherries from the varieties Hardži, Hardusk and Čilar.

I. Z.

137. CERCÓS, A. P. and
FAVRET, E. A.

632.451.2:537.5

"*Ustilago maydis*", una nueva fuente de radiación mitogenética. (U. maydis, a new source of mitogenetic radiation).

Rev. Argent. Agron. 1946 : 13 : 128-37.

Experiments are reported to show that *U. Maydis* is a source of strong mitogenetic radiation.

138. JOHNSON, T. and
NEWTON, M.

632.452:576.16:575.1

Specialization, hybridization, and mutation in the cereal rusts.

Bot. Rev. 1946 : 12 : 337-92.

Literature on the physiological specialization and genetics of species of *Puccinia* is reviewed. The bibliography contains 242 references.

139. JONES, M. A.,
GERSDORFF, W. A. and
MCGOVAN, E. R.

632.951.1:581.192

A toxicological comparison of *Derris* and *Lonchocarpus*.

J. Econ. Ent. 1946 : 39 : 281-83.

Samples of the Sarawak Creeping and Changi No. 3 varieties of *Derris elliptica*, and of *Lonchocarpus utilis* and *L. chrysophyllus* were subjected to chemical analysis and tested for toxicity to house flies. The data indicate that the two *D. elliptica* varieties are of higher insecticidal value than *L. utilis* or *L. chrysophyllus*. The colorimetric determination of rotenone plus rotenoids appears to be the best chemical determination of toxicity.

140. BRETT, C. H. 632.951.1:581.6(76.8)
Insecticidal properties of the indigobush (*Amorpha fruticosa*).
 J. Agric. Res. 1946 : 73 : 81-96.

A. fruticosa L. has been found to be valuable as an insecticidal plant. The toxic agent has not yet been identified. Individual plant analysis has been carried out with a view to future breeding and genetical investigations.

141. MOORE, R. H. 632.951.1-2.111-1.521.6
Some effects of altitude and water supply on the composition of *Derris elliptica*.
 Bot. Gaz. 1946 : 107 : 467-74.

There appear to be intravarietal differences in the adaptability of the Sarawak Creeping variety of *Derris elliptica* (Wall.) Benth. to high altitudes, selections from Guatemala being better adapted than the Puerto Rico types.

ECONOMIC PLANTS 633

142. 633(44)
 Catalogue des variétés de blés, avoines, orges, maïs, pommes de terre, topinambours, betteraves, fourrageres, soyas, cultivées en France.
 (Catalogue of varieties of wheat, oats, barley, maize, potatoes, Jerusalem artichokes, forage beets and soya beans cultivated in France).
 Minist. Agric., Fr. 1946 : Pp. 30.

This catalogue lists the names of approved varieties of the crops mentioned in the title. Synonyms are included.

143. KELLAR, H. A. 633:069.5(73)
Living agricultural museums.
 Agric. Hist. 1945 : 19 : 186-90.

Suggestions concerning the possible exhibits and organization of a national agricultural museum are discussed.

144. PIROVANO, A. 633:575.243:538(45)
Progress and directives regarding electrogenetics.
 Int. Rev. Agric. 1945 : 36 : 173T-89T.

The different methods used at the Institute of Fruit-growing and Electrogenetics, Rome, in the electromagnetic treatment of plant reproductive organs are examined, and a general account is given of the abortive effects and mutations obtained by such treatment. Investigations on maize, grapes, peaches, *Cucurbita* and *Hippeastrum vittatum* are described in detail.

As a result of subjecting maize ovaries to alternating or rotating fields, two days before the emergence of the silks, kernels and plants showing albinistic modifications were obtained. A recessive dwarf mutation was also produced by this method. Electromagnetic treatment appeared to exert an effect upon the dominance of purple and black kernel characters. In the case of maize, electromagnetic treatment of the pollen produced considerably less effect than treatment of the ovaries.

Interesting results have been obtained by electromagnetic treatment of the pollen in crossing dessert grapes of the European and Asiatic types. Considerable changes in flavour, aroma and colour are mentioned. The most valuable result of this work is a large fruited, stoneless dessert grape, with medium early maturity.

By application of electromagnetic treatment in peach hybridization, promising types with a smaller stone and a very sweet juicy pulp have been secured; some of these peach trees have stood up fairly well to spring frosts.

The hybrids *Cucurbita maxima* x *C. moschata* and *C. maxima* x *C. Pepo* var. *Melopepo* have also been produced with the aid of electromagnetic treatment.

145. FRANDSEN, K. J. 633:576.356.5:575.127.2:581.6
Iagttagelser over polyploide Former af nogle Kulturplanter. (*Beta*,
Brassica, *Sinapis*, *Trifolium* og *Medicago*). [Observations on
polyploid forms of some cultivated plants (*Beta*, *Brassica*,
Sinapis, *Trifolium* and *Medicago*)].
Tidsskr. Planteavl 1945 : 49 : 445-96.

The polyploids here discussed were obtained during 1938-39; in most cases, by repeated application of an aqueous solution of colchicine to the sprouted seedlings of *Beta vulgaris*, *Brassica campestris*, *Brassica nigra*, *Sinapis alba*, *Trifolium pratense*, *T. hybridum* and *T. repens* and *Medicago sativa*. Some new fodder mangel material, Gul Øtofte, was produced by smearing full grown roots with 1% colchicine-agar (cf. *Plant Breeding Abstracts*, Vol. IX, Abst. 759).

The treatment of the seedlings, and particularly sugar mangels and clovers, resulted often in chimaeras with $2n$ and $4n$ tissue, and generally only some shoots of the plants had double the normal number of chromosomes.

The number of tetraploids or plants with tetraploid shoots is most often 5-10% of the treated plants. Species also differed in this respect and interspecific hybrids often give a higher percentage of polyploid plants than the pure species. Thus from the F_1 of swede rape x turnip rape, 60-70 polyploid plants were obtained of which 40% were alloctoploids or amphitetraploids and about 60% were amphidiploids. This material will be described elsewhere.

As diploid cells in mixoploid tissue seem to grow more quickly than the tetraploids, the chances of islands of tetraploid tissue producing new shoots are less. Interspecific hybrids give a higher percentage of polyploids, doubtless because the allotetraploid tissue is better able to compete with the allodiploid than the autotetraploid is with the auto-diploid.

The writer has grouped the analysis of his observations for each crop under morphology, dry matter content, fertility and chromosome number determinations.

Though, broadly speaking, the well known morphological features of polyploids were exhibited in most of the crop plants discussed, there were also differences between the response of the various species to chromosome doubling, some tetraploids being better balanced physiologically than others. Among the clovers, $4n$ white clover and lucerne appeared inhibited in growth, but red clover was not affected in this way.

Dry matter production seemed to be about the same in $4n$ and $2n$ forms.

In many tetraploid families of sugar mangel, the root was smoother and plumper than in the diploids. Nitrogen content was high in the $4n$ plants probably owing to their large cells. The same relationship was also found in $4n$ and $2n$ white and black mustards.

It seems likely that tetraploid types of red clover could be found with a higher fodder yield.

Fertility in the $4n$ sugar mangels seemed to be about the same as in the $2n$ forms.

Though $4n$ red clover was in general much less fertile than the $2n$, there were also $4n$ plants with a high set of seed. Moreover, in many cases the most fertile plants were also superior in plant size and luxuriance of foliage. It also seems likely that $4n$ plants could be found with a shorter corolla tube than the diploids.

The $4n$ white mustard yielded only 50% of the amount of seed normal for the diploid, and the corresponding figure for $4n$ black mustard was 60-70%.

146. KOVALEVSKIĬ, G. V. 633:581.9
(The theoretical foundations of the geography of cultivated
plants).
Priroda (Nature) 1946 : No. 1 : 35-44.

Plant geography includes the study of both wild and cultivated plants; but study of the latter in relation to their environment and the influence of man has led the author to the conclusion that the geography of cultivated plants should be treated separately. In the course of the article he defines the scope of the subject in general terms, attempting no more than brief references to examples of breeding and cultivation among horticultural and other crops.

I. Z.

147. 633-1.521.5(48.5)

Förädlingsarbetets organisation och kontrollen över utsädesvaror.
(**The organization of the breeding work and the control of seed for sale**).

Weibulls Ill. Årsb. 1945 : 40 : 4-5.

The organization, functions and methods used at the Weibullsholm Plant Breeding Institute in breeding varieties of the different crop plants and vegetables in Sweden are described. Control of varietal purity is exercised by the Government Central Seed Control Institute (Statens Centrala Frökontrollanstalt).

148. 633-2.19-1.521.6

Gråfläcksjuka. En av manganbrist orsakad växtsjukdom. (**Grey speck. A disease caused by manganese deficiency**).

Flyghb. Växtskyddsanst., Stockh. 1945 : No. 75 : Pp. 4.

Oats, which are among the crops attacked, show varietal differences in resistance to the disease. Fyris, one of the older varieties, suffers least, and Klock II and Engelbrekt are also resistant.

149. 633.00.14(47.1)

VESIKIVI, A. 633.1.00.14(47.1)

Försöksresultat från Finska Mosskulturföreningens försöksstationer år 1941. (**Results from the experimental stations of the Finnish Society for the Cultivation of Bogland, 1941**).

Finska MossFören. Årsb. 1942 : 46 : 45-76.

SALOHEIMO, L.

Försöksresultat från Finska Mosskulturföreningens Karelska försöksstation för år 1942. (**Results from the Karelian Experimental Station of the Finnish Society for the Cultivation of Bogland, 1942**).

Ibid. 1943 : 47 : 48-69.

The first of the above reports, which is from the Leteensuu and the Karelian Experimental Stations, includes trials with cereals, hemp and potatoes on various types of soils. Many Finnish varieties of cereals and peas were tested against Swedish varieties.

The report from the Karelian Station gives similar data on trials of Finnish and other varieties in 1942.

CEREALS 633.1

150. 633.1(82)

633.52(82)

Descripción de las principales variedades de trigo, avena, cebada, centeno, lino y maíz, cultivadas en la República Argentina. (**Description of the principal varieties of wheat, oats, barley, rye, flax and maize, grown in the Argentine Republic**).

Publ. Minist. Agric. Republica Argentina 1945 : No. 20 : Pp. 262.

Extensive morphological and physiological details are given of the principal cereal and flax varieties of Argentina. An illustration of each variety is included, and notes are also given on the genetical origin of each variety, its disease resistance in the case of wheat, and the degree of earliness in the case of flax.

151. 633.1:575(49.4)

KOBLET, R. (**Results and aims of research in cereal cultivation**).

Schweiz. landw. Mh. 1944 : No. 3 : 57-87.

To improve cereals in Switzerland, foreign varieties are tested or improved varieties are sought by breeding. In the case of oats, spring barley and spring wheat, the first course has proved satisfactory. Varieties of these cereals are compared by the author in detail. As regards winter cereals, the successful varieties have been almost all indigenous.

A large collection made from home and foreign spelt cultivating districts just before the

war provides a basis for future spelt breeding research. This robust cereal is invaluable for land where cultivation is difficult, but the yield needs improvement. Hybridization progenies have given promising strains, which however need further testing.

A report of a commission in 1935 showed that the methods and aims of breeding have produced valuable winter wheats, the qualities of which should be retained in further breeding research. Improved yield, resistance to lodging and winter conditions, early ripening and quality of grain are to be sought by hybridization.

For rye, as for other cereals, a larger number of pedigree families and prolonged testing of individual strains are needed. A rye suitable for mountain levels is the object of research at the new research station at Fellers. Selection of strains suitable for mountain cultivation from the old land varieties is being kept in view, since they alone are adapted to extreme climatic conditions.

In the case of maize, the aim is the production of early ripening varieties with good yield. Here also valuable types have been obtained by searching the old maize growing areas. Some foreign varieties such as Prerauer, which are early ripening, have been grown on a large scale for grain. E. W.

152.

633.1:576.356.5

633.1:537.531:576.356.5

633.1:581.036.1:576.356

SMITH, L.

A comparison of the effects of heat and X-rays on dormant seeds of cereals, with special reference to polyploidy.

J. Agric. Res. 1946 : 73 : 137-58.

Investigations are reported on the effect of heat and X-ray treatment on dormant seeds of cereals, as determined by germination percentages and seedling height. The material consisted of the following: diploid, tetraploid and hexaploid forms of wheat, oats, barley, maize and rye, *Aegilops uniaristata*, and the amphidiploid of *Triticum monococcum* x *Ae. uniaristata*. The diploid and polyploid forms exhibited a similar tolerance to high temperatures. The polyploids, however, were less injured by X-ray treatment than the diploids. Irradiation previously applied to the heat treatment resulted in slightly more injury to diploid wheat seeds than X-ray treatment only; comparable diploid wheat seeds subjected to high temperature and subsequently to irradiation were less injured than the diploid seeds given irradiation only.

Investigations were also carried out on the effect of heat and X-ray treatment on certain chromosomal aberrations. Heat produced little, if any, effect upon the frequency of chromatin bridges in root-tip cells of diploid, tetraploid and hexaploid wheat, and in diploid and autotetraploid barley. On the other hand, X-ray treatment resulted in a marked increase in the frequency of bridges, the diploids showing lower frequencies than the polyploids. Heat treatment of diploid and tetraploid wheat seeds had little or no effect upon the frequency of translocations. X-ray treatment, however, produced a marked increase, the frequencies being higher in tetraploid than in diploid wheat.

X-ray treatment of diploid wheat seeds also resulted in an increased mutation rate, while heat treatment had no appreciable effect.

153.

FLAKSBERGER, K. A.,

BAHTEEV, F. H.,

MORDVINKINA, A. I.,

JAKUŠEVSKIĬ, E. S.,

IVANOV, N. P. and

POPOVA, G. M.

633.1-1.521.5(47)

(Material for formulating directions for provinces and republics in regard to approval of grain).

Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 159-67.

Detailed instructions are given for the identification, description and judging of wheat, rye, barley, oats, millet, maize, sorghum, rice and buckwheat. Relevant literature for use is cited throughout.

154. GORLENKO, M. V. 633.1-2-1.521.6(47)
 [Twenty-five years of studying diseases of bread cereals in the
 U.S.S.R. (1917-1942)].

Botaničeskii Žurnal (J. Bot. U.R.S.S.) 1946 : 31 : 3-17.

The article deals very briefly with diseases caused by species of *Ustilago*, *Puccinia*, *Tilletia*, *Urocystis*, *Helminthosporium*, *Fusarium*, and by bacteria. Occasional references are made to the breeding of varieties resistant to certain of these diseases. It is mentioned that one race of *Tilletia Tritici* affects soft wheats, and another affects *Triticum dicoccum*. The ability of some cereal varieties to resist certain *Ustilago* species has been attributed to a high rate of germination, distinctive characteristics in flowering, and to other causes. Among the cereal varieties resistant to various races of rust, the following are mentioned: the hybrid wheat Lukjanenko-Vorošilovska, and the oat varieties, Verhnjačka 339, Stepnjak 0648, and the oats from the Ulironov Station. It has been found that the red wheats, Ferrugineum and Milturum, are more easily affected by black chaff than are the white wheats, Lutescens and Velutinum. Work has been done at Kharkov on the elimination of *Helminthosporium* from the élite seed of barley by means of selection within the variety. There is evidence to show that hard wheats and late varieties of wheat are more subject to infection by *Fusarium* than are the soft and early wheats. The varieties of winter wheat most resistant to *F. nivale* are those grown in regions where the disease is prevalent. Varieties with a short vernalization phase are more susceptible to this disease than are those with a long vernalization phase; the most resistant varieties are Kostromka 028, Bateckaja White-eared, Local Awnless, Lutescens 020, and Erythrospermum 0329. I. Z.

155. BERTELLI, J. C. 633.1-2-1.521.6(89)
 633.52-2-1.521.6(89)
 Control de las enfermedades de los cereales y del lino. (Control of
 cereal and flax diseases).

Rev. Asoc. Ingenieros Agron., Montevideo 1946 : 18 : No. 73 : 9-32.

Brief indications are given of those instances in which the utilization of resistant cereal and flax varieties can be profitably used in combating various diseases.

WHEAT 633.11

156. SUNESON, C. A. and
 BRIGGS, F. N. 633.11(79.4)
 Wheat production in California.

Bull. Calif. Agric. Exp. Sta. 1941 : No. 659 : Pp. 18.

This account of wheat production in California includes varietal descriptions, and information on the comparative yields and milling and baking qualities of the principal varieties cultivated.

157. FLAKSBERGER, K. A. 633.11:575(47)
 (On wheats in the western Ukraine and in western White Russia).
 Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry
 Record) 1940 : No. 2 : 40-50.

A historical outline is given of the wheat species, mainly winter forms, grown in the above mentioned regions, where the crop has been grown from the earliest times. Many with economically valuable features are being used in breeding new forms, either by selection from local wheats or by hybridization of local with other forms.

The number of varieties that have been bred is excessive in view of the relatively small amount of differentiation in the ecological features of the regions concerned.

Important tasks are the raising of yields; the production of varieties adapted to local conditions; the organization of official variety trials; the improvement of methods of cultivation by the establishment of centres where local and other varieties can be tested; and breeding operations in which vernalization and intravarietal crossing should be employed to produce wheats of high quality that are also resistant to fungous diseases.

158. BERG, S. O. 633.11:575(48.5)
 Weibulls Original Eroicavete. Ny, mycket högavkastande höstvetesort
 för södra och östra Götalands slättbygder.
 (Weibull's original Eroica wheat. A new, very high yielding
 autumn wheat for southern and eastern plains of Götaland).
 Weibulls Ill. Årsb. 1943 : 38 : 12-23.

The origin, principal characters and performance of this Swedish variety, released in 1943, are recorded in detail, with statistical data on variety trials in which Eroica took part (cf. *Plant Breeding Abstracts*, Vol. XIII, Absts 476 and 478).

159. BERG, S. O. 633.11:575(48.5)
 Weibulls Original Atlevårvete. Ny elit med tidigare mognad utlämnas
 våren 1943. (Weibull's original Atle spring wheat. A new earlier
 maturing elite released in spring 1943).
 Weibulls Ill. Årsb. 1943 : 38 : 10-11.

This wheat has already been mentioned in *Plant Breeding Abstracts*, Vol. XVI, Abst. 1205.

160. QUISENBERRY, K. S. 633.11:575(78.2)
 Pawnee, the new winter wheat for Nebraska.
 Rep. Neb. Bd Agric. 1944 : 127-38.

A detailed account is given of the new Pawnee variety (cf. *Plant Breeding Abstracts*, Vol. XII, Abst. 1200).

161. MEISTER, N. G. 633.11:575"793"(47)
 633.11:575.127.5:633.14(47)
 (Breeding and raising seed of winter wheat).
 Naučnyĭ Otčet Inst. Zernovogo Hozjaĭstva Jugo-Vostoka SSSR za
 1941-42 gg. (Sci. Rep. Inst. Grain Husbandry South-Eastern USSR
 for 1941-42) 1944 : 167-77.

Winter wheat for the South-Eastern region of the U.S.S.R. must be winter hardy and resistant to dry winds and drought.

Some of the best known winter wheats, e.g. *Lutescens* 329 and rye-wheat hybrids from Saratov, are mentioned with observations on their regional adaptation, and the performance of the following wheats and promising rye-wheat hybrids of the Institute of Grain Production for the South-Eastern Region in government trials is recorded: the rye-wheat hybrids *Lutescens* 434/154 and 27/36, and the winter wheats, *Lutescens* 121, *Hostianum* 237/9, *Erythrospermum* 46/131 and 118, and *Lutescens* 1060/10. Details of their yields, hardening capacity, grain quality, and resistance to lodging, drought and cold are given.

In a subsequent outline of breeding technique, in addition to hybridization, mention is made of Lysenko's method of "shattering" the hereditary basis of plants by providing a sharp change in their environment, an operation exemplified by records of vernalization at different temperatures for different periods.

Particulars are also given of seed raising, as practised in connexion with regionally distributed varieties, including the promising *Lutescens* strains 434/154, 27/36 and 121 and *Hostianum* 237/9.

162. ŠEHURDRIN, A. P. and 633.11:575"793"(47)
 MAMONTOVA, V. N. 633.11:575.127(47)
 (Breeding and seed production of spring wheat).
 Naučnyĭ Otčet Inst. Zernovogo Hozjaĭstva Jugo-Vostoka SSSR za
 1941-42 gg. (Sci. Rep. Inst. Grain Husbandry South-Eastern USSR
 for 1941-42) 1944 : 116-37.

Early wheat breeding for the arid region of S.E. Russia showed that the highest yielding and best adapted forms to conditions there were the local spring wheats whose grain was also of good quality, e.g. *Lutescens* 62, *Erythrospermum* 341 and *Hordeiforme* 432. In order, however, to eliminate defects such as shedding and susceptibility to brown rust and to loose smut, interspecific hybridization was undertaken, *Triticum durum* and soft wheat being crossed to obtain (1) a soft wheat with a better grain quality, and (2) *durum*

forms more tolerant as regards conditions of soil and climate. The crosses yielded 25 botanical varieties of *durum* and soft wheats and in addition forms resembling other species not included in the various crosses were also obtained, e.g. plants resembling *Triticum compactum*, *Triticum turgidum*, *Triticum dicoccum*, *Triticum monococcum* and some of the wild wheats. Some combinations gave forms of practical value for breeding. Among the varieties produced were some soft wheats with new economically valuable features, and some interesting new forms of unawned *durum* wheat. Individual selections from a cross between the local varieties Beloturka and Poltavka, and the two unawned soft spring *alborubrum* wheats Sarrubra and Sarroza with red, glabrous ears and white vitreous grain, were ultimately obtained. They are resistant to drought and shedding, and have grain of high quality which is easily threshed.

In the subsequent period from 1927 to 1933, in addition to interspecific crosses, intra-specific crosses were used, the aim being in the latter case early maturity and drought resistance. These features, found in Central Asiatic wheats, were successfully combined with high yield and a satisfactorily filled grain: by graded crossings with the best pedigree varieties, varieties superior to *Lutescens* 62 were obtained.

By interspecific and intraspecific hybridization, promising varieties resistant to drought and to fungous diseases were also isolated.

From 1934 to the present time, breeding has been mainly directed towards obtaining (1) high yielding varieties resistant to rusts, smuts and soil and atmospheric drought, and (2) varieties capable of utilizing to the full the winter and spring water supply in the soil, thus giving high and reliable yields. To this end, crosses of geographically remote forms, graded crosses of hybrids from the collection of the Institute of Plant Industry, and crosses of foreign varieties resistant to fungous diseases and to pests with the best varieties from the Saratov Institute of Grain Breeding and other Russian stations, were made, and interspecific and intergeneric hybridization was also used. As a result, six *durum* wheats, four unawned and two awned, and 11 soft wheats, nine unawned and two awned, were included in the official variety trials between 1933 to 1942.

The most interesting unawned *durum* wheats were *Candicans* 75/09 and 76/10 which surpassed the standard varieties in yield in various districts. Though in 1000 corn weight they were not superior to the best forms of *Hordeiforme* 432, they exceeded *Melanopus* 69 in total yield and porosity of the loaf.

The outstanding soft wheats were *Lutescens* 53/12, 3221, 55/11, s-605, and s-758 and *Albidum* s-43 and s-21. *Lutescens* 53/12 and *Albidum* s-43 and especially s-21 are highly resistant to drought, while *Lutescens* s-605 and s-758 are resistant to brown rust, lodging and to some extent to loose smut. *Lutescens* 53/12 has also done well on an agricultural scale; full details of the performance in various districts are given.

Other promising varieties as regards yield include *Lutescens* s-977, which is resistant to brown rust; *Lutescens* s-48, *Albidum* s-210, the unawned *Triticum durum* variety *Mutico-Valensija* s-381, and *Albidum* s-216, from the cross Sarrubra x *Velutinum* 2187.

Lutescens 55/11 is resistant to *Ustilago nuda*, *Albidum* s-24 to *Tilletia Tritici*, while *Albidum* s-21 and *Albidum* s-43 combine high yield and drought resistance with resistance to local races of *Tilletia Tritici*. Two other wheats, suitable for irrigated land, are *Lutescens* s-605 and *Lutescens* s-758 which are resistant to brown rust and lodging.

Crosses, which are described, of the best varieties of the U.S.S.R. with resistant foreign wheats have resulted in other resistant forms of *Lutescens* and *Albidum*.

A study was also made of the filling of the grain and the root development in different varieties. In seed production, disease resistance is thoroughly tested.

163. LOVE, H. H. and

CRAIG, W. T.

633.11:575.12(74.7)

Better wheat for New York.

Bull. Cornell Agric. Exp. Sta. 1946 : No. 828 : Pp. 27.

The problems of developing improved wheat varieties for New York State are discussed, with particular reference to winter hardiness, stiffness of straw, disease resistance, and quality. Selection by the Department of Plant Breeding has resulted in the production of the varieties Honor and Forward from Dawson Golden Chaff and Fulcaster, respectively.

A commercial seed company selected the variety Junior No. 6 from Goldcoin. More recently a hybridization programme has been undertaken. As a result of this work, four new varieties have been obtained, Valprize, Yorkwin, Nured and Cornell 595. Valprize has been derived from a cross between Valley and St Louis Grandprize, Yorkwin from a cross between a selection of Dietz and Goldcoin, and Nured from a cross between Forward and a selection of Dietz; Cornell 595 is a hybrid involving the varieties Honor, Forward and Nured.

164. CHIN, T. C. 633.11:575.127.5:633.14:575.129

Wheat-rye hybrids.

J. Hered. 1946 : 37 : 195-96.

Cytological data are given on the sterile F_1 hybrid between Chinese wheat ($n = 21$) and rye ($n = 7$), the amphidiploid *Triticale* obtained by treating the hybrid between Chinese wheat and rye with colchicine, the progeny of *Triticale*, and the back-cross progeny of F_1 *Triticale* \times $4n$ rye.

165. ŠNAJDERMAN, JA. A. 633.11:575.127.5:633.289(47)

(Breeding wheat-Agropyron hybrids).

Naučni Otčet Inst. Zernovogo Hozjaistva Jugo-Vostoka SSSR za 1941-42 gg. (Sci. Rep. Inst. Grain Husbandry South-Eastern USSR for 1941-41) 1944 : 178-89.

Three wheat-Agropyron hybrids are described, Nos 560, 563 and 823, obtained from individual plants chosen from among hybrid populations.

No. 560 is derived from the third generation of a cross of *Lutescens* 329 and *A. elongatum*, in which unrestricted pollination had been allowed in the first generations of the hybrid. The ear and grain need further improvement.

No. 563 was obtained in a similar way from the second generation of *Triticum turgidum* \times *A. intermedium*. A shorter vegetation period and a more easily threshed ear is still required. No. 823 was derived in a similar way from the F_4 of *T. sphaerococcum* and *A. elongatum*. The ear and grain still need to be improved.

Other wheat-rye perennial hybrids, Nos 2124, 2473, 1941/9 and 904/5, that have yielded three to four years in succession, have desirable ear, grain and leaf characters, but their progeny have not yet been shown to be perennial.

Wheat-rye hybrids that sprout after seed formation in the first year of growth and give a good yield of green stuff are also mentioned, but they are defective in winter hardiness in the South-Eastern region of the U.S.S.R. Six types are distinguished and their origins and their economic and other characteristics indicated.

The role of conditions of rearing in the production of sprouting forms of wheat-Agropyron hybrids obtained by crossing various species of the parent forms is discussed. Favourable conditions for growth combined with repeated selection of the best plants has resulted in promising types for fodder purposes. Breeding is still proceeding.

Selections from the seventh and eighth generations of spring wheat (*T. vulgare*) and *Agropyron* yielded (a) 3578 progenies, from which 287 were chosen for planting in the field, and (b) 287 hybrid populations from which 75 were planted out. From this material annual interspecific hybrids were obtained, some of which have surpassed the standard *Lutescens* 62 in yield, 1000 corn weight, and seed quality.

Similar work is being successfully carried on with annual winter wheat-Agropyron hybrids.

166. McFADDEN, E. S. and SEARS, E. R. 633.11:575.129:576.16

The origin of *Triticum spelta* and its free-threshing hexaploid relatives.

J. Hered. 1946 : 37 : 81-89, 107-16.

The theories of the origin of the cultivated hexaploid wheats, based on morphological evidence, and, more recently, on cytological data, are reviewed.

Early investigations, begun by the senior author in 1913, showed that a group of morphological characters distinguishing *T. Spelta* from the emmers (*T. dicoccum* and *T. dicoccoides*) also distinguishes *Aegilops squarrosa*. All attempts to obtain hybrids between *Ae.*

squarrosa and the tetraploid wheats failed, when *Ae. squarrosa* was used as the female parent. A single hybrid was, however, finally secured by using the *T. dicoccum* variety Vernal as the seed parent. The single F_1 hybrid plant grew to maturity in 1931, and, as anticipated, exhibited all the characters of *T. Spelta*, but was completely sterile.

Recently, the junior author has obtained highly fertile allopolyploids with $2n = 42$ chromosomes by treating F_1 hybrids of the cross *T. dicoccoides* x *Ae. squarrosa* with colchicine. These synthetic hexaploids closely resemble *T. Spelta*, and when crossed with this species and *T. vulgare* produce highly fertile hybrids with regular meiosis. The C genome of the hexaploid wheats evidently corresponds to the chromosome set of *Ae. squarrosa*.

Additional evidence that *Ae. squarrosa* possess the C genome has been obtained from the amphidiploid *Ae. caudata* x *Ae. squarrosa*. This amphidiploid resembles *Ae. cylindrica* ($2n = 28$) and forms fertile, meiotically regular hybrids with this species, which was previously known to carry both the C genome and the genome of *Ae. caudata* as the result of the work of several investigators.

The hypothesis is suggested that *T. Spelta* is the ancestor of the free-threshing European hexaploids, *T. vulgare* and *T. compactum*, and that *T. Spelta* originated in comparatively recent times in south-eastern Europe or south-western Asia, as the result of chromosome doubling in natural hybrids of *T. dicoccoides* or *T. dicoccum* with *Ae. squarrosa*.

It is also suggested that the recently described Asiatic hexaploids, *T. speltiforme*, *T. rigidum*, *T. Macha* and *T. Vavilovi*, possibly originated as allopolyploids of tetraploid wheat and diploid *Aegilops* species other than *Ae. squarrosa*. Since, however, at least some of the Asiatic hexaploids produce highly fertile hybrids with *T. vulgare* and *T. Spelta*, the forms of *Aegilops* concerned must have been closely related to *Ae. squarrosa*, if this hypothesis is correct.

It is believed that after the introduction of *T. Spelta* into central and western Europe, the species came into contact with the free-threshing and now extinct Lake Dwellers' wheat. The authors consider the Lake Dwellers' wheat to be a tetraploid, in contrast to the general view that this is a variety of *T. vulgare*, and they suggest that it may have been the ancestor of the free-threshing tetraploid *T. persicum*, which is still to be found in parts once inhabited by the Lake Dwellers. Crossing between *T. Spelta* and the Lake Dwellers' wheat is thought to have produced *T. vulgare* and *T. compactum* within historic times. It is presumed that *T. vulgare* resulted in the substitution of a single block of genes from the Lake Dwellers' wheat, including genes for compactness, awn suppression and free-threshing. This hypothesis makes explicable certain anomalous phenomena associated with *T. vulgare* and *T. compactum*, notably the seemingly unrelated effects of the *spelta* "factor", the occurrence of *T. Spelta* segregates in crosses between *T. vulgare* and *T. dicoccum*, and the occasional spontaneous occurrence of speltoid forms in pure varieties of *T. vulgare* or intervarietal crosses of *T. vulgare*.

Finally, the authors suggest that the Lake Dwellers' wheat may have arisen as an amphidiploid of *T. monococcum* ($n = 7$) and *Agropyron triticum* ($n = 7$); the latter species, it is pointed out, commonly occurs as a weed in the wheat fields of south-eastern Europe.

167. BLODGETT, E. C. and

SCHULTZ, H. K.

633.11:581.44:581.143.32(79.6)

Stem distortion of wheat.

J. Amer. Soc. Agron. 1946 : 38 : 717-22.

A report is given of the results of preliminary work on an abnormal condition of the stem in wheat, referred to as "twisted stem". The possible causes of twisted stem are discussed, and it is possible that the condition is genetically conditioned.

168. BAYFIELD, E. G.

633.11:581.6

The effect of wheat variety upon maltose values.

J. Amer. Soc. Agron. 1946 : 38 : 624-29.

The importance of variety as a factor affecting the maltose value of the flour was demonstrated. Hard flinty wheats, such as Chiefkan, produce flours with a high maltose value, while the flours from softer textured varieties, such as Blackhull and Clarkan, have lower maltose values.

169. BOEUF, F. 633.11:581.6(61.1)
 La valeur industrielle des blés durs de Tunisie. (**The industrial value of the hard wheats of Tunisia**).
 C.R. Acad. Agric. Fr. 1946 : 32 : 401-04.
 Details are presented of the semolina yields of the Tunisian varieties Mahmoudi 552, Sindyouk Mahmoudi 870, Biskri A C 2, Sbei 292 and Chili.

170. FINNEY, K. F. and 633.11:581.6:578.08
 YAMAZAKI, W. T.
Water retention capacity as an index of the loaf volume potentialities and protein quality of hard red winter wheats.
 Cereal Chem. 1946 : 23 : 416-27.

A simple and rapid method for estimating the protein quality of hard wheats is described, based upon the water retaining capacity of the flour. The method is considered to be useful as a means of testing in the early stages of breeding.

171. 633.11-2.111-1.521.6(44)
 CRÉPIN, C. 633.11-2.452-1.521.6(44)
 Le blé au cours de la campagne 1941-42. (**Wheat during the campaign 1941-42**).
 Acad. Agric. Fr. 1943 : Pp. 6.

This review of wheat cultivation in France during 1941-42 cites the names of varieties that have shown resistance to cold and to black rust.

172. SCHRIBAU, M. 633.11-2.111-1.521.6(44)
 Le froid et les blés en terre. (**Cold and wheat in the ground**).
 C.R. Acad. Agric. Fr. 1939 : 25 : 29-44.

The seriousness of injury to French wheat varieties through cold is emphasized, and indications are given of cold resistant varieties. A discussion on these points followed, the speakers including Brétignière, Benoist, Demory, Guillemot, Lafite, Schribaux, Hitier, Demolon and Count Delamarre de Monchaux.

173. ŠMELEV, I. H. 633.11-2.111-1.521.6(47)
 (**Frost resistance of the main groups of varieties of winter wheat under conditions at Puškin**).
 Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 78-86.

Using laboratory methods involving the use of a cold chamber and greenhouse for treatment at various temperatures, 500 wheat specimens from the world collection were tested for at least two years for frost resistance. The relatively small number of frost resistant forms discovered were mainly varieties bred by various stations in regions of the U.S.S.R. with severe winters, though some resistant types came from the U.S.A., Canada, Sweden, Finland and the Italian Alps. Under favourable conditions of hardening, the resistant varieties withstood frosts from -15 to -22°C ., and were also observed to pass through the first phase of hardening more rapidly than the less resistant forms. Under the conditions of the experiment, the frost resistance of the winter wheats tested ranged from -8 to -22°C .

That the high frost resistance of winter wheats is not always accompanied by a long vernalization stage was seen from the reaction of Dutch and Swiss varieties to low temperature.

174. STEFANOVSKIĬ, I. A. 633.11-2.112-1.521.6:578.08(47)
 (**Resistance of spring wheat to hot, dry winds**).
 Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 87-97.

Forty wheats of different species and ecological groups were subjected at the stages of earing and of milk ripeness to artificial drought conditions by means of a drought chamber constructed from Votčal's model. The writer here records the general effects of drought

and its effect on the number of seeds in the main ear, on the yield of spring wheats and their 1000 corn weight at different stages of development.
Votčal's dry-wind chamber should also be of assistance in determining the breeding value of different varieties.

175. SIBILIA, C. 633.11-2.452:576.16:631.521.6(61.2)
Notizie sulla specializzazione fisiologica di *Puccinia triticensis* Erikss. in Libia. (Information on the physiological specialization of *P. triticensis* Erikss. in Libya).
Agricoltura Colon. 1940 : 34 : 100-01.

At least three physiological races of *P. triticensis* have been isolated from the wheat variety Mentana grown in Sidi Mesri, Libya. Of these, one is new and is termed L.1; its reaction to differential hosts is described.

176. CARTWRIGHT, W. B. and SHANDS, R. G. 633.11-2.7-1.521.6:575(73)
Resistance to the Hessian fly in crosses of some common spring wheats.
J. Amer. Soc. Agron. 1946 : 38 : 845-47.

Data are given on the reaction to Hessian fly of F_2 and F_3 crosses of W38 with Beirao (P.I. 56202-2 and P.I. 56202-5), Portugez (P.I. 56204-7), Barbella-Santa Martha (P.I. 56222-13), Lobeiro-Barbella (P.I. 56225-1), Triunfo (P.I. 104138-3), and the unnamed wheats P.I. 94379-6, P.I. 94549-5, P.I. 94571-14, P.I. 111245-10 and P.I. 125390-8. These varieties of *Triticum vulgare* had previously been found to be resistant to Hessian fly in tests in Indiana during the period 1939-43. The preliminary results indicate that it may not be difficult to combine the different genes for resistance in a single variety.

OATS 633.13

177. ÅSANDER, F. 633.13:575(48.5)
Havreförsök vid Sveriges Utsädesförenings Jämtlandsfilial 1918-1945.
(Oat trials at the Jämtland Station of the Swedish Seed Association 1918-45).
Sverig. Utsädesfören. Tidskr. 1946 : 56 : 148-58.

Though oats are not grown predominantly in Jämtland, the need for a suitable variety exists and the Svalöf breeding station is collaborating with its branch stations in Norrland to produce new varieties for Northern Sweden sufficiently early ripening to allow of normally developed grain each year, and having a higher yield, stiffer straw and better grain quality than existing varieties. Among the varieties produced which have been useful as breeding material during 1918-45 are Sv 25/356, the ancestor of the Same oat, and the Orion series, Orion I, Orion C and Orion II, which represent an important advance in oat breeding.

The present report contains much useful information on the origin of the older oat varieties bred in Sweden as well as on some recent productions of which previous reports have been already reviewed in *Plant Breeding Abstracts*.

178. GELIN, O. and UNDENÄS, S. 633.13:575(48.5)
Weibulls Original Triohavre. Ny förädling för Svea- och Götaland.
(Weibull's original Trio oat. A new strain for Svealand and Götaland).
Weibulls Ill. Årsb. 1943 : 38 : 8-10.

The new Swedish black-white oat hybrid is described with information on its origin and its performance in comparative trials in various districts (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 602).

179. MIDDLETON, G.K. 633.13:575(73)
Oats-with-an-overcoat.
Sth. Seedsman 1946 : 9 : No. 9 : 12, 36.

An account is given of the new winter-hardy oat variety Letoria, developed from the cross Lee x Victoria (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 620).

180. RASMUSSEN, K. J. 633.13-1.521.5:581.145.1:578.088
 Undersøgelser over skridningen hos havre 1927-39. (**Investigations
 on shooting in oats 1927-39**).
 K. VetHøjsk. Aarsskr. 1941 : 1-37.

The time of shooting can be used to determine the authenticity of varieties of oats. The experiments here recorded show what other factors must also be taken into account. In recording earliness, the time when shooting begins should be used.

181. STANTON, T. R. 633.13-2-1.521.6:575(73)
The present status of breeding for disease resistance in oats.
 Phytopathology 1946 : 36 : p. 688. (Abst.).

Recent breeding for disease resistance in oats in the United States is summarized. Vicland, Tama and other disease resistant varieties have been developed from crosses between Richland and Victoria. Groups of disease resistant winter oats have been obtained from crosses of Victoria with Lee, Fulghum and Nortex, and from hybrids between the Fulton type of early red spring oats and selections of Victoria x Richland. New varieties, derived from crosses involving Bond, include Clinton, Benton, Bonda, Mindo and Eaton. These varieties show improved crown and stem rust resistance, stiffer straw, and higher yielding capacity and test weight. In Wisconsin the Forvic variety bred from the cross Forward x (Victoria x Richland) is a promising new disease resistant variety. Attention is drawn to the problem of new physiological races and to diseases of increasing importance such as *Helminthosporium*.

182. ÅKERMAN, Å. 633.13-2.19-1.521.6:575(48.5)
 Nya iakttagelser rörande olika havresorters motståndskraft mot grå-
 fläcksjuka. (**New observations on the resistance of different
 varieties of oats to grey spot**).
 Sverig. Utsädesfören. Tidskr. 1946 : 56 : 159-72.

In this report the incidence of grey spot at Svalöf, its cause and the susceptibility of different varieties of Swedish and other oats are considered. The following groups are discussed: (1) medium late and late white and yellow grained oats and land varieties; (2) early white oats; (3) black oats from central Sweden; (4) early black oats, and (5) a class consisting mainly of oats of foreign origin.

Group (1) comprises most of the older and more recent Swedish oats and also other Scandinavian and German types many of which have been used in hybridization at Svalöf; the varieties of the Probsteier type differ little in susceptibility, all showing mild symptoms; on the whole, among the main improved white oats, the differences in resistance are so small that they would not seem to be a very important factor in the choice of varieties. In group (2) the Norwegian varieties Perle and Melöj proved comparatively resistant, while the Improved Dala oat and Vit Odal, from Guldregn I x Improved Dala, were very susceptible, though Vit Odal did show more resistance than its pollen parent. Vidar and 01167 from the same cross seem more resistant, but a sister line 01166 was more susceptible. The American Gopher oat and the extremely early Sv 25/357, obtained from sample of a six-rowed land barley from Norsbotten,* appear resistant. The very early six-rowed barley, the standard for earliness, is also obviously resistant. As in group (1) the land oats show some resistance.

Group (3) bore out their good reputation as resistant types. There is, however, a possible relationship here between resistance and soil conditions, and this must be taken into account in judging breeding material.

The early black oat group has long been known as relatively resistant, but the lines 0668 and 0660 which have been used in some crosses, e.g. in the ancestry of Orion II, proved more susceptible.

In the fifth miscellaneous group, comprising mainly foreign varieties, the exceptional resistance of *Avena strigosa* was evident, but its physiological basis still requires investigation. Imported varieties should be tested in "grey spot" soil before being used in breeding. Åkerman's earlier findings were confirmed by a study of the F₄ from Orion II x 01300

* In land varieties of six-rowed barley, oats occur as an admixture.

and Orion II x 01302, which showed that, by long-term systematic breeding with careful selection of parents, resistance can be ultimately increased though its genetical basis is highly complex.

183. SALOHEIMO, L. 633.13.00.14(47.1)
Jämförelse av havresorter på Finska Mosskulturföreningens Karelska försöksstation under tioårsperioden 1933–1942. (**A comparison of oat varieties of the Karelian Experimental Station of the Finnish Society for the Cultivation of Bogland, during the ten year period 1933–1942**).

Finska MossFören. Årsb. 1943 : 47 : 103–28.

This report provides parallel information for oats to that previously given by the same author for barley (cf. Abst. 202).

184. 633.13.00.14(48.9)
Forsøg med Havresorter 1939–1942. (**Trials with oat varieties 1939–42**).

Tidsskr. Planteavl 1943 : 47 : 720–24.

Brief details are given of the performance of standard and new Swedish and Danish varieties, and also preliminary experiments with new varieties in trials held on different soils at various places in Denmark.

The Svalöf Fold oat is regarded as synonymous with the older Sol oat.

RYE 633.14

185. 633.14:575.12(47)
KRASNJUK, A. A. 633.14–1.531.12(47)
(**Breeding and seed raising of winter rye**).

Naučnyĭ Otcët Inst. Zernovogo Hozjaĭstva Jugo-Vostoka SSSR za 1941–42 gg. (Sci. Rep. Inst. Grain Husbandry South-Eastern USSR for 1941–42) 1944 : 153–66.

The local Eliseevskaja variety of rye, Saratovskaja No. 1, which is winter hardy and resistant to drought, lodging and diseases, and Hibridnaja, a rye-wheat hybrid, have undergone trials in which Saratovskaja No. 1 surpassed Eliseevskaja in yield and was in turn surpassed by Hibridnaja. Hibridnaja exhibits vigorous growth and large but somewhat wrinkled grain, and is likely to suit the more humid north and north-western regions of the South-East.

More recently, new varieties have been bred, using the heterogeneous population method which consists in selection under conditions of natural pollination. Details of the best procedure are given. Two populations, Volžanka No. 7 and Saratovka No. 8, obtained from local ryes, have excelled Saratovskaja No. 1 in yield. In trials in 1940–41, the populations Karaganda No. 14 and Volžanka No. 7 surpassed the yield of Saratovskaja No. 1 by 2.3% and 17.8% respectively.

Based on Lysenko's theory of the possibility of altering the nature of plant organisms by environmental conditions, experiments were conducted with crosses of winter spring rye, and hybrids of high fertility were obtained, though the quality of the seed was inferior, especially in the cross of the winter form Saratovskaja No. 1 with spring rye. Winter hardiness was also very deficient, which is attributed to the absence of dominance of the spring habit in crosses with winter rye when the normal time of autumn sowing is adopted. Nevertheless nearly twice as many hybrid plants survived the winter than non-hybrids. Spring sowing gave similar results with, however, certain differences, in particular as regards the reciprocal crosses. Here, Saratovskaja No. 1 x spring rye and the reciprocal gave 22% and 58% respectively more than the spring rye parent.

In similar crosses in which Eliseevskaja rye was used, winter hardiness decreased somewhat in the F_2 , especially where spring rye was the female parent, but the grain was superior in several respects to Eliseevskaja.

Similar results were obtained in back-crosses with Saratovskaja No. 1, though here the survival figure for winter hardiness was 93.5% where Saratovskaja No. 1 was crossed by

spring rye, and 77.6% for the reciprocal, the corresponding percentage for Saratovskaja No. 1 being 98.2. Moreover the yields and quality of the grain of the hybrids was good, especially where spring rye was the female parent.

The role of conditions of cultivation in making such crosses to alter the nature of plants is pointed out.

186. GLUŠČENKO, I.

633.14:581.162.3:575.115

(Intervarietal hybridization of rye).

Doklady Vsesojuz. Akad. Sel'sk. Nauk im. V.I. Lenina (Proc. Lenin

Acad. Agric. Sci. U.S.S.R.) 1945 : Nos 4-5 : 11-23.

The purpose of this article is to show that, by means of unrestricted cross-pollination, the vigour and typical characters of a variety can be preserved, and that the yield and 1000 corn weight of a variety whose pollination has been hitherto restricted, can be increased. The example is quoted of a rye variety in which, after eight successive years of unrestricted cross-pollination with pollen from plants of many different varieties, a recessive character was converted into a dominant.

The author attributes stability of type, despite very various sources of pollen, to the vigour and selective power which unrestricted pollination engenders in plants of a variety, enabling them to maintain their dominant characters and to strengthen those which are recessive. He supports his argument by referring to Lysenko's hypothesis of the mutual assimilation of the male and female reproductive cells, and to various views held by Darwin and Naudin. Mendel is also quoted, but his arguments against the conclusions of Naudin's pollination experiments with *Mirabilis Jalapa* is interpreted by the author as confirmatory of them.

I. Ž.

MAIZE 633.15

187.

633.15:575(77.7)

Report on agricultural research for the year ending June 30, 1945.

Rep. Ia Agric. Exp. Sta. 1945 : Pt II : Pp. 91.

Maize

In developing inbred lines the value of testing combining ability in S_0 or S_1 top-crosses has been demonstrated (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1245).

A glossy mutation induced by ultra-violet radiation was found to be non-allelic with gl_1 , gl_3 , gl_4 , gl_6 , gl_7 , gl_{10} , gl_{11} , gl_{12} and gl_{13} . Data were obtained suggesting that gl_{11} and V_{16} are linked; the latter factor is known to be located on chromosome 8.

Seeds from plants homozygous for the gene ps germinate prematurely. They are also characterized by the development of pigment in the aleurone layer and scutellum; this pigment is probably lycopene, which has not previously been reported in maize. The factor pair $Ps ps$ is probably located on chromosome 5.

The effect of the multiple alleles, Wx , wx , wx^a , upon starch properties has been investigated (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 756).

Tests of resistance to *Ustilago Zeae* suggest that Mexican and Guatemalan maize is more resistant than the varieties of the Corn Belt.

A comparative study of the disease resistance and growth response of native and exotic maize and related *Andropogoneae* is reported.

Further physiological investigations support the following conclusions: (1) inbreds in general require a longer period than single crosses to complete the formative period, the latter being defined as the number of days from the date of planting to the appearance of the tassel primordia; (2) not only are the stems of the inbreds considerably later in reaching the stage of the formation of the tassel primordia, but they are inferior in length, cross-sectional area, and number of vascular bundles in comparison with the single crosses; (3) hybrid vigour was found to be operative mainly during the formative period; and (4) the two inbreds Lancaster 289 and Osterland 420 show a superior rate of development and size during the formative period, and should be valuable in hybrid improvement.

A cytological study of the response of maize seedlings to colchicine was carried out to investigate the erratic production of tetraploidy.

Sweet corn

Several new inbreds are to be released.

Popcorn

An account is given of the popcorn breeding programme in Iowa.

188. RICHEY, F. D. 633.15:575.1:575.125

Hybrid vigor and corn breeding.

J. Amer. Soc. Agron. 1946 : 38 : 833-41.

Genetical theories of hybrid vigour are surveyed in relationship to hybrid maize production. The author reaches the conclusion that the interaction of dominant favourable genes remains the most probable explanation of heterosis. It is also emphasized that little conclusive evidence is available concerning the relative importance of hybrid vigour and inherent productiveness as causes of the high yields in maize hybrids, but that the results of practical breeding indicate that the highest yields tend to be obtained when the higher yielding inbreds are used in hybrid combination.

189. STADLER, L. J. 633.15:575.242.061.63

Spontaneous mutation at the *R* locus in maize. I. The aleurone-color and plant-color effects.

Genetics 1946 : 31 : 377-94.

A review is given of information on the genetics of the *R* locus in maize, determining aleurone colour and red and purple plant colour; and the technique for identifying spontaneous mutations in maize is discussed. The gene or gene group *R'*, producing coloured aleurone and coloured plant, was found to mutate with appreciable frequency to *r'* and *R''*, forms with colourless aleurone and coloured plant, and coloured aleurone and colourless plant, respectively. Mutations to *r''*, a form with colourless aleurone and colourless plant, were extremely rare, but not so rare as would be expected if due to the chance coincidence of independent mutations for aleurone colour and plant colour. The mutants *R'*, *r'* and *r''* did not affect gametic viability or physiological efficiency. Mutation for aleurone colour showed no appreciable effect upon plant colour expression, while mutation for plant colour had no effect upon the expression of aleurone colour. Mutation for plant colour, however, exerted a marked effect upon mutability for aleurone colour. This result contradicts the hypothesis that *r'* and *R''* are independent mutations of distinct components of an original gene complex (*R'*); further experiments are in progress.

190. RUSCONI, C. 633.15:576.16(82)

El maíz en las tumbas indígenas de Mendoza. (Maize in the native tombs of Mendoza).

Darwiniana, B. Aires 1945 : 7 : 117-19.

Figures and short descriptions are given of maize cobs recovered from native tombs in the provinces of Mendoza and San Juan.

191. BURNHAM, C. R. 633.15:576.356.2:575.143

An "*Oenothera*" or multiple translocation method of establishing homozygous lines.

J. Amer. Soc. Agron. 1946 : 38 : 702-07.

A possible method, termed the "*Oenothera*" or multiple translocation method, of obtaining the homozygous condition immediately is discussed theoretically. It is suggested that suitable translocations could be used so that hybrids between normal plants and translocated stocks would produce a chromosome ring in meiosis. The progeny obtained by selfing such an F_1 plant would consist of heterozygotes, recognizable by their high rate of pollen abortion, and two types of plants with normal pollen, each of which would be homozygous for one of the two gametic combinations. The possible use of the method in maize is outlined.

In the author's view, haploids should prove valuable in the rapid production of homozygous lines if genetic markers are available to facilitate their recognition and pollination is possible on a large scale.

192. GREEN, J. M. 633.15:576.356.5:581.331.23:581.14
Comparative rates of pollen tube establishment in diploid and tetraploid maize.
 J. Hered. 1946 : 37 : 117-21.

The pollen grains of diploid and tetraploid maize were studied with regard to relative rates of germination and pollen tube establishment. It was observed that the haploid pollen became established much more rapidly than the diploid, on both diploid and tetraploid silks. Relative osmotic pressures of the pollen grains were also determined, haploid grains being compared with diploid, and starchy (*Wx*) pollen with waxy (*wx*). The haploid and starchy pollen, both of which showed a more rapid pollen tube establishment, were found to possess higher osmotic pressures. It is emphasized that differences in pollen tube establishment depend not only upon differences in osmotic pressure values but also upon several other physiological factors.

193. WEAVER, H. L. 633.15:581.14:575.125
A developmental study of maize with particular reference to hybrid vigor.
 Amer. J. Bot. 1946 : 33 : 615-24.

Anatomical investigations were carried out on two inbreds of maize and their F_1 hybrid. The hybrid seeds germinated earlier, and the hybrid plants were taller than their parents and throughout development possessed a greater leaf volume. The growth rates of inbreds and hybrids were however similar, indicating that the greater size of hybrids was due to the maintenance of an initial advantage in comparison with the inbred lines. The hybrids were more extensively vascularized than the parents, except the first sampling three days after planting, and also showed a higher rate of differentiation of the vascular bundles. This result suggests that increase in size on the one hand, and vascularization and differentiation on the other, are two distinct physiological processes, and that differences in extent of vascularization and rate of differentiation must be taken into consideration in accounting for hybrid vigour.

194. VAN LANEN, J. M.,
 TANNER, F. W. (jun.) and
 PFEIFFER, S. E. 633.15:581.46:581.192:575.12
Composition of hybrid corn tassels.
 Cereal Chem. 1946 : 23 : 428-32.

A chemical analysis of hybrid maize tassels was carried out, with a view to the possible use of the tassels obtained by detasseling in the course of hybrid production as a livestock feed. The tassels were found to be good sources of protein and vitamins at the normal time of detasseling; it is thought that the dried tassels may be suitable as an addition to poultry feeds.

195. ELLIOTT, C. and
 JENKINS, M. T. 633.15-2.484-1.521.6(75.2)
***Helminthosporium turcicum* leaf blight of corn.**
 Phytopathology 1946 : 36 : 660-66.

Field inoculation tests of reaction to *Helminthosporium turcicum* Pass. were carried out on a large number of maize inbreds and single and double hybrids. The majority of lines and hybrids exhibited susceptibility. The inbred NC12 was significantly more resistant than any other line tested. Only slight infection was shown by ten other inbreds. In general the reaction of the inbreds was transmitted to their hybrids.

BARLEY 633.16

196. HUYSKES, J. A. 633.16(49.2)
 Brouwerstrassen. (**Varieties of malting barley**).
 Zesde Jaarboekje Nationaal Comité voor Brouwergerst, Wageningen
 1941 : 96-109.

Provisional estimates of the average yields in 1940 are given for various malting barleys grown in Holland. Much of the information is based on the official variety lists issued annually and regularly reviewed in *Plant Breeding Abstracts*.

197. LAMPRECHT, H. and HERTZMAN, N. 633.16:575(48.5)
Weibulls Original Balderkorn. Ny förädling. (**Weibull's original Balder barley. A new production**).
Weibulls Ill. Årsb. 1943 : 38 : 4-7.

A full description is given of this new Swedish barley released in 1942, and of its performance in various trials (cf. *Plant Breeding Abstracts*, Vol. XIII, Absts 476 and 508).

198. GOMBERT, J. 633.16:575(49.2)
De veredeling van gerst in het bijzonder met het oog op de industriele verwerking. (**The breeding of barley especially with a view to industrial manufacture**).
Achtste Jaarboekje Nationaal Comité voor Brouwgerst, Wageningen 1943 : 26-31.

A historical outline of the breeding of malting barley in Holland and other European countries is given with useful notes on past and present varieties and their origin. General aims in barley breeding are set out, partly on the basis of the text-book by Roemer and Rudolf, and supplementary information is added on the known requirements in countries where malting barleys are grown, the importance of protein content, enzymes and chaff percentage being discussed separately.

199. THAYER, J. W. and DOWN, E. E. 633.16:575(77.4)
Bay, a new barley variety.
Quart. Bull. Mich. Agric. Exp. Sta. 1946 : 28 : 270-71.

Bay is a new barley variety developed from a cross between Minnesota 450 and Spartan. In yield it equals Wisconsin 38, and has a slightly higher test weight and stiffer straw than this variety; it also ripens 2-3 days earlier. As a malting barley it is as acceptable as Wisconsin 38.

200. WELLENSIEK, S. J. 633.16:575.11
633.16:576.16
Iets over erfelijkheid en afstamming van gerst. (**On the genetics and phylogeny of barley**).
Vijfde Jaarboekje Nationaal Comité voor Brouwgerst, Wageningen 1940 : 83-94.

A concise, instructive account is provided of the genetical basis of inheritance and its application to barley, together with a note on the origin of this cereal.

201. THUNAEUS, H. 633.16:575.243:581.6:537.531
Nya malkornssorter genom röntgenbestrålning. (**New varieties of malting barley by means of X-irradiation**).
Svensk BryggTidskr. 1946 : 61 : 73-83.

Since 1944, experiments by the Stockholm Breweries Ltd. (AB Stockholms Bryggerier) have been in progress to study effect of X-irradiation on the malting value of barley. From the records here given, it would appear that X-ray mutants from the two barleys used, Svalöf Gull (Svalöf Golden) and Abed Maja differ from their respective parents in malting properties; moreover such changes may be qualitative as well as quantitative and of a desirable or undesirable nature.

That it is more difficult to induce desirable mutations in Maja than in Gull, cannot yet be affirmed at this early stage in the investigation.

202. SALOHEIMO, L. 633.16:575.3(47.1)
Jämförelse av kornsorter på Finska Mosskulturföreningens Karelska försöksstation under åren 1930-1940. (**A comparison of barley varieties at the Karelian Experiment Station of the Finnish Society for the Cultivation of Bogland during 1930-1940**).
Finska MossFören. Årsb. 1942 : 46 : 104-23.

Particulars are given of the performance of Finnish, Swedish and other barleys on different

types of soil, and the summary includes information on the characteristics and origin of the Finnish varieties, Tammi and Louhi, and the conditions to which they are best adapted.

203. DASANANDA, S.

633.16:581.46:575.11

Quantitative and qualitative inheritance in barley.

Abstr. Thes. Cornell Univ. 1943 (1944) : 330-32.

The following conclusions were obtained as the result of investigations on four six-rowed spring barleys.

Awn length of the lateral florets is controlled by a single factor, designated *Lk*. Homozygous dominant plants *Lk Lk*, possessed long lateral awns, usually 10 cm. in length or longer. Heterozygous plants had lateral awns ranging from four to nine cm. in length; homozygous recessive plants lacked lateral awns.

Investigations on the weight and breaking strength of the straw are reported. These characters appear to be conditioned by several factor pairs; it is pointed out, however, that environmental factors play a very important part in determining straw weight and breaking strength.

The length of the rachis internode was found to be controlled by one main gene, provisionally designated *Lx*. Parent plants of the genotype *Lx lx* had a mean rachis internodal length of 4.7 mm.; parent plants of the genotype *lx lx* had a mean length of 2.6 mm. A bimodal curve was obtained for the F_2 data on this character.

The length of the fine awn on the outer glume depends upon a single factor, designated *E₂*. The long awn of the outer glume was found to be completely dominant to the short awn. The author points out that the factor *E₂* is not the same as the factor *E* of Robertson *et al.* (cf. *Plant Breeding Abstracts*, Vol. XI, Abst. 708), which refers to the wide outer glume. Probably the presence or absence of pubescence on the dorsal surface of the outer glume involves three genes, two of which are complementary, while the third gene pair gives segregations in the ratio 3:1. The inheritance of this character is to be further investigated.

The presence of pubescence on the rachis is conditioned by three genes, designated *Pbr₁*, *Pbr₂* and *Pbr₃*, respectively. Any two of these genes may act in a complementary relationship.

Two types of segregation were observed in a study of the teeth on the outer dorsal veins of the lemma. One was a regular 3:1 ratio of toothed and untoothed plants in the F_2 ; F_3 segregations also supported the F_2 evidence of a single factor controlling the presence of teeth, and this factor was designated *Tl*. But certain crosses gave a 50:14 ratio in the F_2 ; no definite conclusions could be made from the F_3 data on these crosses.

Awn length was associated with the weight and breaking strength of the straw. Whether this association is genetical or physiological is not known.

The length of the rachis internode, pubescence of the outer glume, length of the awn on the outer glume, the pubescence of the rachis, and the teeth on the outer dorsal veins of the lemma were found to be linked characters. A linkage map for *Pbr₁*, *E₂* and *Lx* is given.

204.

633.16:581.6(49.2)

Brouwgerstrassen. (**Malting barley varieties**).

Vijfde Jaarboekje Nationaal Comité voor Brouwerst, Wageningen 1940 : 30-42.

Notes are given on various foreign and Dutch malting barleys grown in Holland, with tabular data from the annual descriptive variety lists, issued by the Plant Breeding Institute, Wageningen, and regularly reviewed in *Plant Breeding Abstracts*.

205.

633.16:581.6(49.2)

633.16-1.521.5(49.2)

De voornaamste eischen welke aan brouwerst gesteld worden. (**The principal requirements demanded in malting barley**).

Vijfde Jaarboekje Nationaal Comité voor Brouwerst, Wageningen 1940 : 106-07.

A table is given showing desiderata regarding varietal purity, morphological and physiological features and germination capacity.

206. KUYK, P. G. 633.16:581.6(49.2)
 Aan welke eischen moet goede pelgerst voldoen? (**To what requirements must good pearl barley conform?**)
 Achtste Jaarboekje Nationaal Comité voor Brouwergerst, Wageningen 1943 : 40-46.

This paper deals with the use of various foreign winter barleys for the production of pearl barley for export and the use of Dutch barleys for home production.

207. HUYSKES, J. A. 633.16:581.6:582(49.2)
 Brouwergerstrassen. (**Malting barley varieties**).
 Zevende Jaarboekje Nationaal Comité voor Brouwergerst, Wageningen 1942 : 95-112.

The information in this article, in which the writer confines himself to spring forms, is based upon the variety lists issued regularly by the Wageningen Plant Breeding Institute and upon some results from the trials run by the Dutch National Committee for Malting Barley.

In addition to statistics on performance, notes are given on the grain characteristics and the varying distribution of the different varieties in 1941 and 1942, with possible reasons for the changes observed during those years.

The varieties mentioned include Kenia, Mansholt's Two-rowed, Saxonia, Isaria, Goud, Bethges, Oelzes XIII, Lago, Houbier's Four-rowed, I.V.P. 39/60 and P.B.

208. ÅBERG, E. and WIEBE, G. A. 633.16:582(73+71)
Classification of barley varieties grown in the United States and Canada in 1945.

Tech. Bull. U.S. Dep. Agric. 1946 : No. 907 : Pp. 190.

Previous systems of barley classification are reviewed, and an account is given of the genus *Hordeum* and the geographical relationships of the different varieties. The growth and morphological characters are discussed in relation to their taxonomic significance. Identification keys are presented, and detailed descriptions of the varieties include information on their history and distribution. This useful bulletin is well illustrated with photographs.

209. HUYSKES, J. A. 633.16:582:581.6
 Brouwergerstrassen. (**Malting barley varieties**).
 Achtste Jaarboekje Nationaal Comité voor Brouwergerst, Wageningen 1943 : 62-74.

This article, and its statistical tables, record the performance of the barleys Abed Kenia, Saxonia, Goud, Mansholt's Two-rowed spring barley, Bigo, Bethges, Oelzes XIII, Lago and I.V.P. 36/60. Zege and Bigo have been found unsuitable for malting and Bigo even for pearl barley making; Haisa is to be tested.

210. WAAL, V. A. v. D. 633.16-1.521.5(49.2)
 633.16-1.531.12(49.2)
 De zaaizaadvoorziening bij zomergerst. (**The supply of spring barley seed for sowing**).
 Zesde Jaarboekje Nationaal Comité voor Brouwergerst, Wageningen 1941 : 72-81.

Of the total area under various spring barley varieties in Holland in 1940, 4% was under Bigo, 22% under Goud, 45% under Kenia, 19% under Mansholt's Two-rowed, 7% under Saxonia, 2% under Zege and 1% under various other forms. New types obtained by selection from land races, by hybridization between existing varieties or by mutation must be put at the disposal of the practical farmer, but varietal purity and standard of quality must be maintained, and the Dutch breeder's role and rights in this matter are described in this article.

211. JENSEN, N. F. 633.16-2.421.1:576.16:631.521.6:575.11(74.7)
Powdery mildew of barley. Studies of yield losses and the inheritance of disease resistance.
 Abstr. Thes. Univ. Cornell 1943 (1944) : 333-34.

The physiological form of powdery mildew generally occurring in the vicinity of Ithaca, New York, was identified as race 4, or a form very similar in pathogenicity. Resistance to race 4 was studied in the two crosses Goldfoil x Wisconsin No. 38 and Ohio No. 3144 x Goldfoil. Reaction to the disease was found to depend upon a single factor pair; susceptibility appeared to be an incompletely dominant character.

212. SHANDS, R. G. 633.16-2.45-1.521.6:575.116.1
An apparent linkage of resistance to loose smut and stem rust in barley.
 J. Amer. Soc. Agron. 1946 : 38 : 690-92.

Linkage between the factors for resistance to stem rust and loose smut is reported in the barley selection H47-26. This selection derived resistance to stem rust from Chevron and resistance to loose smut from Trebi.

213. SHANDS, H. L. and
 SCHALLER, C. W. 633.16-2.451.2-1.521.6:575(77.5)
Response of spring barley varieties to floral loose smut inoculation.
 Phytopathology 1946 : 36 : 534-48.

Several methods of inoculating barley varieties with loose smut were compared. The most satisfactory method was found to be the injection of the barley flowers by means of hypodermic needle attached to a small rubber bulb containing chlamydospores of *Ustilago nuda*. Information is given on the reaction of many C.I. numbered varieties, hybrid selections and miscellaneous varieties of barley, as determined by this "needle" method. A considerable number of the selections under test in the Wisconsin breeding programme possess a loose smut resistant variety as one parent. Trebi has so far proved to be the most promising source of resistance, but unfortunately Trebi develops weak straw under Wisconsin conditions, and most of its derivatives inherit this undesirable characteristic. Work is in progress to combine resistance to several diseases with desirable agronomic qualities and smooth awns.

214. 633.16.00.14(44)
 633.79.00.14(44)

Société d'Encouragement de la Culture des Orges de Brasserie et des Houblons en France SECOBRAH. Rapports sur la campagne 1942. (Society for Encouraging the Cultivation of Malting Barleys and Hops in France SECOBRAH. Reports on the campaign 1942). Paris, 1944 : Pp. 60.

Société d'Encouragement de la Culture des Orges de Brasserie et des Houblons en France SECOBRAH. Rapports sur la campagne 1943. (Society for Encouraging the Cultivation of Malting Barleys and Hops in France SECOBRAH. Reports on the campaign 1943). Ibid. 1944 : Pp. 75.

Extensive details are given on the performance of French malting barley varieties and hybrids, also of hop varieties.

215. HARTONG, B. D. 633.16.00.15(49.2)
Teelt en onderzoek van brouwergerst in het buitenland. (Growing and investigation of malting barley abroad).
 Zevende Jaarboekje Nationaal Comité voor Brouwergerst, Wageningen 1942 : 74-87.

Information is given on the various official and other institutions dealing with research on malting barley in European countries and the U.S.A.

MILLETS AND SORGHUM 633.17

216. CIRK, G. P. 633.171:575(47)
(Extending the range of millet towards the north).
 Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 108-11.

In the course of an account of investigations on the performance of a number of different ecological and geographical types of millet in various northerly regions of the U.S.S.R. the following points are recorded:—

Methods of cultivation were found to affect the habit of the plants. In some cases, e.g. millet No. 3276, plants developed better and had a higher 1000 corn weight in the northern region than in the south.

Seed is being sown at the Kirovskaja State Breeding Station preparatory to breeding and raising of hardened northern millets.

Large scale variety trials and research in the north should be conducted, and the findings from the experimental sowings at the hut laboratories utilized.

217. JAKUŠEVSKIĬ, E. S. 633.171:575(47)
(Varieties of millet raised by the Kuban Experimental Station of the Institute of Plant Industry).
 Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 105-07.

After six years of study of about 1000 specimens of millet from the Russian world collection of the Institute of Plant Industry, including some varieties bred in the U.S.S.R., the following five new varieties are announced as drought resistant, high yielding, resistant to smut and very promising for Krasnodar, Rostov and Ordžonikidze: Otrado-Kuban 0157, Otrado-Kuban 0267, Otrado-Kuban 0193, Otrado-Kuban 0280 and Otrado-Kuban 0210. These varieties are suggested as suitable to replace Saratov 0853 in the above mentioned regions.

218. ROMANOV, V. L. 633.171:575(47)
633.171-1.531.12(47)
(Seed raising, breeding and cultivation of millet).
 Naučnyi Otčet Inst. Zernovogo Hozjaistva Jugo-Vostoka SSSR za 1941-42 gg. (Sci. Rep. Inst. Grain Husbandry South-Eastern USSR for 1941-42) 1944 : 209-14.

For millet production in the U.S.S.R., new varieties were needed with higher yields, resistance to lodging and shedding, and differing in the time taken to ripen. Two varieties, Nos 311 and 68, appear to meet these requirements, judging by their performance in trials with the standard Saratovskoe 853. Two other promising new strains are Nos 40 and 87, mentioned for their yield of 24-25% above the standard and the high technological qualities of the grain.

Seed improvement and methods of cultivation have also received attention.

219. CHIN, T. C. 633.174:576.356.5:581.04
The cytology of polyploid sorghum.
 Amer. J. Bot. 1946 : 33 : 611-14.

Tetraploids and octoploids of hegari were produced by colchicine treatment. In the investigation of meiosis, no significant reduction in chiasma frequency was observed with increased chromosome number. In both tetraploids and octoploids most of the chromosomes paired as bivalents, and quadrivalent formation and chiasma frequency showed no correlation. Pollen grain size was found to be proportional to chromosome number. The polyploids flowered later than the diploids, and the percentage of sterile pollen in the tetraploid and octoploid was 19% and 80%, respectively. In view of the lateness of maturity and partial sterility of the polyploids, these forms are not likely to be of economic value, but it is suggested that they may be useful in intergeneric hybridization.

RICE 633.18

220. VIGUIER, P. 633.18:575(66.1)
 Note sur le problème de l'intensification de la riziculture dans le bassin du Niger. (**Note on the problem of increasing the cultivation of rice in the Niger basin**).
 Agron. Trop. 1946 : Nos 7-8 : 375-87.

Among the projects urged, is the establishment of two experimental stations for studying rice and rice breeding, one at Mopti for the Central Delta of the Niger* and the other at Kankan, where some facilities already exist, for the upper region of the Niger basin. It is most necessary that rice varieties be developed resistant to shedding and more uniform than those now in use. An immense range of breeding material exists; varietal collections have been started at Mopti and San.

221. ADAIR, C. R. and JONES, J. W. 633.18:575.12:575.41
Effect of environment on the characteristics of plants surviving in bulk hybrid populations of rice.
 J. Amer. Soc. Agron. 1946 : 38 : 708-16.

Plants showing combinations of several desirable characters were obtained from bulk hybrid populations of rice which had been grown for eight generations at three different locations. The results indicate that use of bulk hybrid populations is a valuable method of breeding, particularly in breeding for disease resistance where it is necessary to grow large populations.

222. DILLEWIJN, C. VAN 633.18:575.243:581.04
 Een proef omtrent colchicinebehandeling van rijst. (**An experiment on colchicine treatment of rice**).
 Landbouwk. Tijdschr., Wageningen 1941 : 53 : 544-45.

It has been suggested that, in the Gramineae, the relative rarity of chromosome doubling after colchicine treatment is due to the coleoptile hampering or preventing the colchicine solution from entering the germinating seed. When this theory was tested by a suitable technique, involving partial removal of the coleoptile of rice, the seedlings resulting from the colchicine treated kernels, yielded abnormally large grains with coarser hairs and longer awns than untreated rice.

223. PORTÈRES, R. 633.18:581.48
 Les riz à encoches. (**The notched rices**).
 Agron. Trop. 1946 : Nos. 1-2 : 69-72.

The lateral notch on the caryopsis of several rice varieties is declared to lack diagnostic significance, though it may occur more frequently in some forms than others.

224. VILLALBA, O. P. 633.18:582(72.91)
 El cultivo del arroz en Cuba. (**The cultivation of rice in Cuba**).
 Rev. Minist. Agric. Cuba 1946 : 29 : 64-71.

There is a paragraph in this article on the names and synonyms of the principal varieties grown in Cuba.

225. BACKER, C. A. 633.18:582(91)
The wild species of *Oryza* in the Malay archipelago.
 Blumea, Leiden 1946 : Suppl. III : 45-55.

A general taxonomic account is given of the five species *O. granulata* Nees et Arn., *O. Meyeriana* (Z. et M.) Baill., *O. minuta* Presl., *O. fatua* Koen. and *O. Ridleyi* Hook. f.

FORAGE GRASSES 633.2

226. KELLER, W. 633.2/3-1.421(79.2)
Designs and technic for the adaptation of controlled competition to forage plant breeding.
 J. Amer. Soc. Agron 1946 : 38 : 580-88.

A method is described which enables the forage plant breeder to select upon the basis of

* The region of the river above Timbuktu where it divides into a complex series of anastomosing branches.

performance under conditions of intraspecific and interspecific competition similar to those occurring in pasture plantings.

227. COVAS, G. 633.2:576.312.35(82)
 Número de cromosomas de algunas Gramíneas argentinas. (**Chromosome numbers of some Argentine Gramineae**).

Rev. Argent. Agron. 1945 : 12 : 315-17.

The following diploid chromosome numbers are reported for various Argentine grasses: *Pappophorum Wrightii* S. Wats., 20; *Cottea pappophoroides* Kunth, 20; *Blepharidachne Benhamiana* (Hackel) Hitchc., 14; *Tridens pilosa* (Buckl.) Hitchc., 16; *Melica andina* Hauman, 18; *Stipa gynyrioides* Phil., 44; and *Bouteloua simplex* Lag., 40.

228. HENRARD, J. T. 633.2:582
Notes on the nomenclature of some grasses, II.

Blumea, Leiden 1941 : 4 : 496-538.

This rather miscellaneous review of taxonomic problems in the Graminae includes descriptions of the following new species from various parts of the world: *Panicum peladoense*, *Paspalum limbatum*, *Paspalum eburneum*, *Paspalum trichophyllum*, *Lasiurus scindicus*, *Coelorhachis Parodiana*, *Arthraxon linifolius*, *A. pallidus*, *Chrysopogon tenuiculmis* and *C. borneensis*.

229. CHASE, A. 633.2:582(95)
Papuan grasses collected by L. J. Brass, III.

J. Arnold Arbor. 1943 : 24 : 77-89.

The following new species are described: *Bromus scopulorum*, *Poa egregia*, *P. lunata*, *P. multinodis*, *P. pilata* and *Arundinella furva*.

230. HARTUNG, M. E. 633.21:576.312.35
 633.289:576.312.35
Chromosome numbers in *Poa*, *Agropyron*, and *Elymus*.

Amer. J. Bot. 1946 : 33 : 516-31.

Extensive details are given on the chromosomal variation within the genera *Poa*, *Agropyron* and *Elymus*. The following diploid chromosome numbers are reported: *P. ampla* Merr., 62, 63, 64, c.65, 68, 70-71, 97, c.100; *P. arachnifera* Torr., 54-56, 56, c.63; *P. arida* Vasey, 63, 64, 84, c.90, c.103; *P. bulbosa* L., 42; *P. Canbyi* (Scribn.) Piper, c. 72, c.82, c.83, 84, 85, c.90, 93, c.94, c.99, 105-06; *P. compressa*, 42, 50; *P. confinis* Vasey, 42; *P. Cusickii* Vasey, 42; *P. Douglasii* Nees, 28; *P. epilis* Scribn., c.84; *P. fibrata* Swal., 63, 64; *P. glaucifolia*, 50, 56; *P. gracillima* Vasey, 81, c.84, 86; *P. interior* Rydb., 28; *P. juncifolia* Scribn., 62 63-64, 78, 84, "*P. longifolia* Trin.", 43; *P. macrantha* Vasey, 28; *P. nervosa* (Hook.) Vasey, 62, 62-63, 63, 63-64, 70; *P. nevadensis* Vasey, 62-63, 63, 64, c.65, c.66, 70; *P. palustris* L., 28; *P. pratensis* L., 49, 49-50, 50, 50-51, 52, 54, 56, 58, 64, 66, 67, 68, 68-69, 70, 73, 74, 74-77, 76, 78, c.80, 81, 84; *P. rhizomata* Hitchc., 28; *P. scabrella* (Thurb.) Benth., 44, 61-63, c.62, 63, 64, c.68, 81, 82, 84, 86, c.88, c.91, 104; *P. secunda* Presl, c.74, 81, 84, 85-87, c.87; *P. spondylodes* Trin., 28; *P. subfastigiata* Trin., 91-92, 97; *A. caninum* (L.) Beauv., 28; *A. cristatum* (L.) Gaertn., 14, 28; *A. dasystachyum* (Hook.) Scribn., 28; *A. Elmeri* Scribn., 28; *A. elongatum* (Host) Beauv., 70; *A. inerme* (Scribn. et Sm.) Rydb., 14, 28; *A. intermedium* (Host) Beauv., 42, 43; *A. Michnoi* Roshev., 28; *A. pauciflorum* (Schwein.) Hitchc., 28; *A. Pringlei* (Scribn. et Sm.) Hitchc., 28; *A. riparium* Scribn. et Sm., 28; *A. sibiricum* (Willd.) Beauv., 28; *A. Smithii* Rydb., 28, 56; *A. spicatum* (Pursh) Scribn. et Sm., 14, 28; *A. subsecundum* (Link) Hitchc., 28; *A. Tauri* Boiss. et Bal., 28; *A. trichophorum* (Link) Richt., 42; *E. canadensis* L., 28; *E. cinereus* Scribn. et Merr., 28; *E. glaucus* Buckl., 28; *E. junceus* Fisch., 14; *E. trilocoides* Buckl., 28; and *E. virescens* Piper 28.

The taxonomic implications of these cytological findings are discussed. *A. inerme* is only doubtfully distinct from *A. spicatum*.*

* By an oversight, this species is referred to in the author's summary as *A. cristatum*.

231. SMITH, D. C. and
NIELSEN, E. L. 633.21:581.16:581.162.3
**Comparative breeding behavior of progenies from enclosed
and open-pollinated panicles of *Poa pratensis* L.**
J. Amer. Soc. Agron. 1946 : 38 : 804-09.

A study was made of the effects of bagging panicles upon seed formation in *P. pratensis* and the frequency of sexual, aberrant plants in the progeny. The material investigated comprised a group of plants of widely diverse morphological characters chosen at random from the breeding nurseries, and a group of normal apomictic, intermediate and sexual plants whose breeding behaviour in terms of the percentage of aberrants occurring in their progeny had been previously analysed. In both groups bagging was found to have some effect upon seedling production, panicles from open-pollinated plants producing more numerous and vigorous seedlings than bagged panicles. Bagging was, however, found to have no effect upon the subsequent frequency of aberrants.

232. ATWOOD, S. S. and
MACDONALD, H. A. 633.262-2.112-1.521.6:575.42
**Selecting plants of bromegrass for ability to grow at controlled
high temperature.**
J. Amer. Soc. Agron. 1946 : 38 : 824-32.

Clones of *Bromus inermis* Leyss. were grown for a seven-week period in chambers, in which the temperature was maintained at 70° F. and constant illumination from fluorescent bulbs was provided. At the end of this period the plants were in mid-bloom and were harvested for hay. The temperature was then raised to 80° F., and two aftermath crops were cut at monthly intervals. A third aftermath crop was obtained from the clones at 85° F. For the hay crop highly significant clonal differences were found in stand, average height, dry weight per original cutting and percentage dry weight. For each of the aftermath crops highly significant differences were obtained in dry weight per cutting, height, number of new tillers, dry weight per new tiller and percentage dry weight. These preliminary results suggest that this type of test may be valuable in selecting strains which give good yields during hot weather in midsummer.

233. SCOTT, L. B. 633.264(73)
The South's all-level grass.
Sth. Seedsman 1946 : 9 : No. 5 : 15, 55.

An account is given of the Suiter tall meadow fescue.

234. HENRARD, J. T. 633.266:582
On a new species of *Paspalum* from the island of Bonaire.
Blumea, Leiden 1943 : 5 : 324-27.

A new species of *Paspalum* is described from the island of Bonaire off the coast of Venezuela. It has been named *P. bonairense* Henrard and is most closely allied to the Cuban species *P. rocanum* León.

235. CHIPPINDALL, L. 633.281:582(6)
633.282:582(6)
Contributions to the grass flora of Africa.
Blumea, Leiden 1946 : Suppl. III : 25-41.

The following new tropical grass species are described, viz. *Urelytrum Henrardii* and *Danthoniopsis acutigluma*.

236. BLAKE, S. T. 633.283:582(95)
633.285:582(95)
Two new grasses from New Guinea.
Blumea, Leiden 1946 : Suppl. III : 56-62.

The species described are *Ancistragrostis uncinoides* and *Buergersiochloa macrophylla*. The first species is allocated to a newly established genus of the Agrostidae; it is suggested that *Buergersiochloa* should be placed in a tribe of its own, the Buergersiochloae.

237. COVAS, G. and BOCKLET, M. 633.285:576.312.35
 Número de cromosomas de algunas Gramineae-Stipinae de la flora argentina. (**Chromosome numbers of some Graminae-Stipinae of the Argentine flora**).
 Rev. Argent. Agron. 1945 : 12 : 261-65.

The following diploid chromosome numbers have been reported for Argentine representatives of the Stipinae: *Aristida adscensionis* L., 22; *A. mendocina* Phil., 22; *A. subulata* Henr., 44; *A. Spegazzinii* Arech., 22; *Piptochaetium bicolor* (Vahl) Desv., 22; *P. napostaense* (Speg.) Hackel, 22; *Stipa humilis* Cav., 66; *S. Neaei* Nees, 66; *S. plumosa* Trin. et Rupr., 44; and *S. speciosa* Trin. et Rupr., 66.

238. SANTOS, J. V. 633.285:582
The Philippine, Chinese, and Indo-Chinese species of the grass genus *Garnotia* Brongniart.
 J. Arnold Arbor. 1944 : 25 : 85-96.

In this account of the variable genus *Garnotia*, three new species are described: *G. fragilis*, *G. caespitosa* and *G. philippensis*.

239. PARODI, L. R. 633.285:582(8)
The Andean species of the genus *Stipa* allied to *Stipa obtusa*.
 Blumea, Leiden 1946 : Suppl. III : 63-70.

An account is given of the *Stipa* species of the Puna de Atacama. One new species, *S. Henrardiana*, is described.

240. KLOOS, A. W. (JUN.) 633.286:582(49.2)
An adventitious new *Deschampsia* species.
 Blumea, Leiden 1946 : Suppl. III : 22-24.

D. Henrardii, a new adventive Dutch grass, is described. Its affinities are with *D. flexuosa* and *D. setacea*.

241. BOR, N. L. 633.287:582(54)
A new species of *Dactyloctenium* from India.
 Blumea, Leiden 1946 : Suppl. III : p. 44.

D. Henrardianum is a newly described species from Pamban, Madras.

242. JANSEN, P. 633.288:582(68.8)
***Eragrostis Henrardii*, nov. spec.**
 Blumea, Leiden 1946 : Suppl. III : 42-43.

E. Henrardii is a hitherto undescribed species from south-western Africa.

243. TIHOVSKAJA, Z. P. and PERVUHINA, N. V. 633.289(47)
(*Elymus arenarius* in the far north—can it be brought under cultivation?)
 Priroda (Nature) 1946 : No. 2 : 75-78.

E. arenarius grows in the far north on sands, gravels and peats. The grain is used as food, and the herbage as animal fodder. It can also be used in basket and paper manufacture. The species can be hybridized with rye, wheat and barley. I. Z.

244. MCCLURE, F. A. 633.289(86)
Bamboo in Ecuador's highlands.
 Agric. Amer. 1946 : 6 : 164-67.

An account is given of the various bamboos found growing in the mountains of Ecuador.

245. GRÖNTVED, J. 633.289:575.127.5:576.312.35
Agropyrum junceum (L.) Beauv. x *Elymus arenarius* L. [***A. junceum*** (L.) Beauv. x ***E. arenarius*** L.]
 Bot. Tidsskr. 1946 : 46 : 407-11.

The identity of the hybrid and its putative parents is fully discussed in the light of past and present records. Cytological study has revealed $2n = 42$ chromosomes in the hybrid, while *Elymus* has $2n = 56$ and *A. junceum* $2n = 28$.

246. STEBBINS, G. L. (JUN.),
 VALENCIA, J. I. and
 VALENCIA, R. M. 633.289:575.127.5:576.354.4:582
Artificial and natural hybrids in the Gramineae, tribe Hordeae.
II. *Agropyron*, *Elymus* and *Hordeum*.
 Amer. J. Bot. 1946 : 33 : 579-86.

Descriptions are given of an artificial hybrid between *Hordeum nodosum* and *Elymus glaucus*, and a natural hybrid between *Agropyron pauciflorum* x *H. nodosum*. Both hybrids were completely sterile. The former hybrid resembled specimens of *E. aristatus* Merr., while the latter resembled certain specimens of *E. Macounii* Vasey. All specimens referred to as *E. Macounii* are considered to represent hybrids between various species of *Agropyron* and either *H. nodosum* or *H. jubatum*. The meioses of hybrids *H. nodosum* x *E. glaucus* and *A. pauciflorum* x *H. nodosum* were studied. In both hybrids meiosis was very irregular, a high proportion of univalents being observed. The nature of the pairing is discussed. The sterility of the hybrids is largely due to lack of chromosome homology, but the meiotic behaviour of *A. pauciflorum* x *H. nodosum* treated with colchicine and containing sectors with the doubled chromosome number suggests that genetically conditioned sterility is also operative. The cytological evidence suggests that *A. pauciflorum* and *E. glaucus* are much more closely related to each other than either species is related to *H. nodosum*. If all morphological differences between the three species are taken in account, it is considered that the morphological data support this conclusion.

247. HUBBARD, C. E. 633.289:582
***Henrardia*, a new genus of the Gramineae.**
 Blumea, Leiden 1946 : Suppl. III : 10-21.

Two new genera, *Parapholis* and *Henrardia*, are proposed for accommodating certain species formerly ascribed to *Lepturus* sensu lato.

248. MCCLURE, F. A. 633.289:582(59.7)
New bamboos, and some new records, from French Indo-China.
 J. Arnold Arbor. 1942 : 23 : 93-102.

Six new bamboo species are described from the vicinity of Sai Wong Mo Shan, Tonkin, viz. *Indosasa angustata*, *I. solearis*, *Bambusa Tsangii*, *Lingnania atra*, *L. sesquiflora* and *Dinochloa alata*.

LEGUMINOUS FORAGE PLANTS 633.3

249. WEXELSEN, H. 633.31:581.162.5
 Undersøkelser over blomstring, frøsetting og frøsetting og frøavl i
 luserne. (**Investigations on flowering, seed setting and breeding
 in lucerne**).
 Tidsskr. Norske Landbr. 1946 : 53 : 125-61.

Seed setting in single plants of lucerne, and observations of single plant progenies, under conditions of open pollination, showed that the considerable differences found in seed yield per plant were determined in part genetically. Some families surpassed their parents, and by crossing two such families, Idaho 262 and Idaho 473, both derived from Idaho Blackfoot, a new strain Grimm Vidarshov has been obtained.

The problem of the tripping was examined from various aspects and it is concluded that a high amount of automatic tripping had occurred.

The role of bees, temperature and humidity in seed setting was examined.

250. HOROŠAĬLOV, N. G. 633.31:582:575(47)
 (**On some classifications of fodder plants**).
 Vestnik Socialističeskogo Rasteniievodstva (Soviet Plant Industry
 Record) 1940 : No. 2 : 116-23.

The classification by F. Christiansen Weniger and O. Tarman of Anatolian lucerne is here subjected to detailed criticism, and its value for the breeder is incidentally discussed.

251. KITCH, K. 633.32(76.1)

Seed-keeping clover.

Sth. Seedsman 1946 : 9 : No. 10 : 22, 48.

An account is given of *Trifolium lappacea*, first identified in 1924 in Alabama. It provides good grazing and grows about a month later in spring than other clovers, including White Dutch; its seed heads keep off the ground even when excessive spring rains occur.

252. NIJDAM, F. E. 633.321:575.42:578.08

Massaselectie en stamselectie in roode klaver. (**Mass selection and individual selection of red clover**).

Landbouwk. Tijdschr., Wageningen 1941 : 53 : 744-54.

Local strains and races of red clover are valuable because of their adaptation to local conditions and because their heterogeneity offers opportunity for further adaptation under different conditions and may be the cause of their great vitality.

The probable effects of mass selection in a local strain, such as Maas clover or Rosendaal clover, are analysed in detail to show the number of generations needed to attain a desired type, depending on the number of genetic factors involved.

Selected plant material must be kept free from cross-pollination by unselected strains.

The percentage ultimately obtainable of the desired phenotypes is exemplified for characters conditioned by from one to six dominant factors. Though individual selection is much more rapid, the homozygosis attained affects all factors, not only those conditioning the desired phenotype; it may also reduce vigour and will certainly cause a decrease in adaptability to environmental changes.

253. MINDERHOUD, A. 633.321:581.162.3:578.08

Over de bestuiving van de roode klaver. (**On the pollination of red clover**).

Landbouwk. Tijdschr., Wageningen 1941 : 53 : 755-94.

In his survey of the literature, the author deals briefly with self-sterility and *in extenso* with insect pollination, including work on technique. His own observations are appended.

254. HOROŠAĬLOV, N. G. 633.361:581.162.32(47)

(**On cross-pollination of sainfoin**).

Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 112-15.

Analysis of the results of experiments with *Onobrychis viciaefolia* and *O. antasiatica* at the Kuban Experimental Station and the Kyčerovsk Technical School in Kursk has led the author to conclude that, since in plantings of varieties representing different species grown side by side without isolation, the various progenies generally remain true to type, selective fertilization must be operative. He rejects the genetic principles of Mendel and Morgan and holds that the five kilometres officially specified in the U.S.S.R. for the spatial isolation of varieties of sainfoin is not necessary in the Kuban region.

255. WEIMER, J. L. 633.364-2.421.9-1.521.6

Lespedeza anthracnose.

Phytopathology 1946 : 36 : 524-33.

In inoculation and field tests of resistance to anthracnose (*Glomerella cingulata*), strains of *Lespedeza stipulacea* were in general found to be more resistant than strains of *L. striata*.

256. DUNKLE, P. B. 633.366(73)

Tight-land clover!

Sth. Seedsman 1946 : 9 : No. 9 : 14, 40, 48.

An account is given of the yellow sweet clover variety, Madrid.

257. MACDONALD, H. A. 633.374(73)

Birdsfoot trefoil (*Lotus corniculatus*).

Abstr. Thes. Cornell Univ. 1943 (1944) : 403-05.

A summary is given of the results of various agronomic investigations in New York State relating to the possible use of *L. corniculatus* L. as a forage legume. Superior strains of this crop have been selected (cf. also Abst. 258).

258. MACDONALD, H. A. 633.374(73)
Birdsfoot trefoil (*Lotus corniculatus* L.). Its characteristics and potentialities as a forage legume.

Mem. Cornell Agric. Exp. Sta. 1946 : No. 261 : Pp. 182.

A comprehensive account is presented of the botanical and agricultural characteristics of birdsfoot trefoil, *L. corniculatus* L. Reference is also made to the species *L. uliginosus* Schk. (= *L. major* Sm.). The botanical section includes surveys of the available information on flowering and pollination, self-fertility, cytology, and the classification of the agricultural *Lotus* species. The second section discusses in considerable detail the possible agricultural use of birdsfoot trefoil as a forage plant in the eastern United States, reference being made to the use of this crop in other parts of the world.

An account is included of various experiments carried out in New York State since 1938. The general conclusion is reached that *L. corniculatus* shows sufficient desirable characteristics to warrant further investigation and improvement as a forage crop in the United States.

ROOTS AND TUBERS 633.4

259. HERTZMAN, N. 633.416:575(48.5)
 Landets förråd av kålrotsfrö är otillräckligt. I hur stor utsträckning kan man odla foderbeter i stället för kålrötter? **(The country's supply of rutabaga seed is inadequate. How far can fodder beet be grown instead of swedes?)**

Weibulls III. Årsb. 1943 : 38 : 27-29.

Among the fodder beets here recommended to replace swedes are: (1) Slättbo Barres II strain 16, a selection from Slättbo strain 76 and first put on market in 1941; (2) Särinner III strain 20, released in 1942, derived by repeated family selection from Särinner II strain 73; and (3) the Bacon sugar mangel strain 23, put on the market in 1943.

Slättbo Barres II strain 16 resembles its parent strain in colour, though lighter colours may occur; the tops are tall and luxuriant; the dry matter content and yield of dry matter are higher than in the Slättbo Barres parent. Keeping quality is good and practically no shoots are formed.

Särinner III strain 20 also resembles the mother strain and shows a very low incidence of shoot formation. The dry matter content and the total yield of dry matter exceeds the corresponding values for strain 73.

The new Bacon sugar mangel resembles strain 81 in shape, colour and habit. It keeps well and gave 6% more dry matter than Slättbo Barres strain 76.

260. HERTZMAN, N. 633.416:575(48.5)
 633.42:575(48.5)
 Weibullsholms Växtförädlingsanstalts Original rotfruktsstammar.
(Original strains of root crops from the Weibullsholm Plant Breeding Institute).

Weibulls III. Årsb. 1945 : 40 : 30-37.

Most of the strains enumerated have already been mentioned in *Plant Breeding Abstracts*. The following are of interest:—

The fodder beet Särinner III strain 20, put on the market in 1942, was obtained by family selection from Särinner II strain 73 for higher dry matter content; the top is tall and vigorous and the amount of bolting is particularly low.

The new, yellow sugar-mangel Original Regia strain 24, produced from a cross of Slättbo Barres and sugar beet is high yielding, with a very high dry matter output, and is easily harvested, having practically no lateral roots. Another new strain easy to harvest is Original Bacon 23, put on the market in 1943.

Among the swedes recommended for fodder are: the mild flavoured Original Drottning strain 38; Original Balder strain 99, from a cross between Drottning and Trondhjensk, a form which stores well and has a high dry matter content; the high yielding Original Bangholm strain 22, obtained by family selection from strain 33; and Original Östgöta II

strain 3 which is more resistant to club root than any other strain on the market. Both strain 99 and strain 3 are recommended for culinary use. The white-fleshed fodder turnip Original Östersundom strain 92 is recommended for use in Norrland, Finland and Norway, owing to its rapid growth.

261. SØRENSEN, H. 633.416:575(48.9)
Stammeforsøg med Rødbeder 1941–1943. (**Strain trials with beetroot 1941–43**).

Tidsskr. Planteavl 1944 : 49 : 252–63.

The origin and performance of one Egyptian flat round strain, three Crosby, five Spangsbjerg and two Detroit strains of red beet are recorded. Judging was on the basis of yield, size and colour. As regards shape, it appears that the flat round form is most easily kept constant. The strains differed considerably in resistance to *Actinomyces*, the Spangsbjerg beets being much less susceptible than the others.

262. LAMPRECHT, H. and HERTZMAN, N. 633.42:575(48.5)
Weibulls Original Immuna rova II, stam 26. En ny mot klumprotsjuka mycket motståndskraftig stam. (**Weibull's Original Immuna II turnip, strain 26. A new strain, very resistant to club-root**).
Weibulls Ill. Årsb. 1943 : 38 : 30–31.

Particulars are given of this strain, already referred to in *Plant Breeding Abstracts*, Vol. XVI, Abst. 1303.

263. FRANDSEN, K. J. 633.42:576.354.4:575.127.2
Beiträge zur Cyto-Genetik der *Brassica napus* L., der *Brassica campestris* L. und deren Bastarden, sowie der amphidiploiden *Brassica napocamp-estris*. (**Contributions to the cytogenetics of *B. napus* L., *B. campestris* L. and their hybrids, also of the amphidiploid *B. napocampestris***).
K. VetHøjsk. Aarskr. 1941 : 59–90.

Descriptions are given of the morphology, anatomy, physiological properties and cytology of the F_1 and F_2 hybrids of the Lyngby Bangholm swede and the Yellow Tankard turnip. Lyngby Bangholm had $2n = 38$ chromosomes, Yellow Tankard $2n = 20$ chromosomes, and the hybrid $2n = 29$ chromosomes. The course of meiosis in the hybrid is described in detail. This is compared with the behaviour of the amphidiploid *B. napocampestris* with $2n = 58$ chromosomes.

264. HODGE, W. H. 633.49(8)
Algunos tubérculos olvidados. (**Some overlooked tuberiferous plants**).
Rev. Fac. Nac. Agron., Colombia 1946 : 6 : No. 22 : 1–17.

A general account is given of the South American tuber-producing plants oca (*Oxalis tuberosa* Mol.), melloco (*Ullucus tuberosus* Caldas) and añu (*Tropaeolum tuberosum* R. et P.). The first two forms exist in several varieties. Short descriptions are given of the Cjaya bitter oca, the Sapullu, Chachapea, Paucar, Lluchcho and Mestiza sweet oca varieties, and the Chchucchan melloco.

265. STEVENSON, F. J. 633.491(73)
Spud-in-the-bud!
Sth. Seedsman 1946 : 9 : No. 9 : 15, 34, 39, 42, 46.

Recently developed American potato varieties are discussed.

266. STEVENSON, F. J. 633.491:575(73)
Results and outlook in potato breeding.

Proc. 30th Annu. Mtg. Ohio Veg. and Potato Gr. Ass. 1945 : 148–58.

Past and future work of the National Potato Breeding Programme in the United States is surveyed.

267. KRUŽILIN, L. S. and ANANJEVA, S. V. 633.491:575.127.2:581.165.71(47)
(New methods of potato breeding and methods of cultivating).
 Naučnyi Otcët Inst. Zernovogo Hozjaistva Jugo-Vostoka SSSR za 1941-42 gg. (Sci. Rep. Inst. Grain Husbandry South Eastern USSR for 1941-42) 1944 : 226-42.

In connexion with the organization of seed production and the elaboration of new methods of cultivation of the potato in the province of Saratov, the following work is recorded. A study was made of the biology of the potato including the length of the developmental stages, using *Solanum demissum* and Smyslovskii.

The lower parts of the tubers and the lower buds were more productive than the corresponding upper portions.

The physiological inter-relations of scion and stock were also investigated with reference to vegetative hybridization, the mentor method being applied. Sexual hybridization was also studied.

Grafts and crosses were made each year between varieties and species. In 1941 and 1942, promising forms from different pairs of graft components showed a number of variations, e.g. medium late Lorch on early Petrovskii Jubileinyi produced a hybrid that budded four to seven days later than the stock. The graft of *Phytophthora* resistant No. 8760 on Lorch behaved similarly, but Rannjaja Rosa (Early Rose) on Lorch budded late.

Seedlings of Smyslovskii were also retarded up to twelve days, as compared with plants from tubers, evidently owing to differences still existing in the developmental stages, possibly due to hybridity.

Comparing sexual and vegetative hybridization in crosses of Wohltmann and Smyslovskii, the sexual hybrids were observed to differ *inter se* from 9 to 17 days, with marked morphological changes in the individual crosses, whereas in the vegetative hybrids, the vegetation period showed a range of only 4 to 7 days and still less morphological alteration.

The yield of tubers from some vegetative hybrids far surpassed that of the control for the stock.

As a stock, the early maturing Petrovskii Jubileinyi usually failed to raise the yield, whereas Lorch invariably did so. Different combinations produced different effects and in some cases the increase occurred only in the following year. Also, grafting of two young varieties, *Phytophthora* resistant No. 8760 and Petrovskii Jubileinyi, resulted in a reduction in yield and starchiness of the tuber. The cause of this has not yet been discovered.

Pot and field experiment support the view that grafting gives the best results when the scion is older than the stock.

Scions of *S. demissum* which were not very vigorous weakened the growth of the grafts in the year of grafting and in the year following, and also lengthened the vegetative period of the hybrids. When the stock is older than the scion the onset of budding is accelerated. Further experiments in double and triple grafting of certain satisfactory graft components on to their hybrids to intensify their good effect observed in the grafting have not yet produced definitive results.

As regards enzyme activity, it seems likely that, if the stock shows reduced enzyme activity, it will reduce this function in the scion and vice versa.

It is suggested that the mutual effects on the components in grafts must be transmitted to the progeny. The analysis is not yet finished.

Various new agronomic methods for potato cultivation are also discussed.

268. ZVEREVA, P. 633.491:581.165.71:575.127.2(47)
(New methods of breeding frost resistant potatoes).
 Doklady Vsesojuz. Akad. Sel'sk. Nauk im. V.I. Lenina (Proc. Lenin Acad. Agric. Sci. U.S.S.R.) 1945 : Nos 4-5 : 31-33.

Plants grown from the seeds of self-pollinated *Solanum acaule* provided scions which were grafted on to Smyslovskii, 20-day old sprouts being grafted on to 30-day old sprouts of the stock. The grafted plants were self-pollinated, and a new generation of seedlings was produced. They were again grafted on to Smyslovskii. One grafted plant developed

characters intermediate between those of the stock and scion. The pollen from the flowers of this grafted plant was used to fertilize the flowers of Smyslovskii, Epicure, and other cultivated varieties, and fruit was set. The difficulty of crossing *S. acaule* with these varieties has thus been successfully overcome by means of grafting. Hybrid seeds obtained from the cross between Epicure and grafted *S. acaule* gave rise to plants which withstood $-6^{\circ}\text{C}.$, and yielded tubers weighing 40 to 80 grm. each; about 500 grm. of tubers per plant were obtained. I. Z.

269. THUNBERG, T. 633.491:581.192
Der Citratgehalt der Kartoffel. (**The citrate content of the potato**).
K. Fysiogr. Sällsk. Lund Förh. 1945 : 15 : No. 8 : 1-5.

Varieties for the determinations here described were supplied by Weibull of Landskrona and by O. Tedin of Svalöf. The analysis was based on the Pucher, Sherman and Vickery's colorimetric variation of Stare's pentabromacetone method.

All tubers contained citric acid, but the content varied not only intervarietally but within the varieties. Stored potatoes analysed from February to May averaged 0.25% for citric acid content.

Seedlings contain less than the tubers.

Further lines of research are suggested.

270. WOLF, M. J. and
DUGGAR, B. M. 633.491:581.192
Estimation and physiological role of solanine in the potato.
J. Agric. Res. 1946 : 73 : 1-32.

The experiments included the tuber analysis of 32 potato varieties and *Solanum Com-mersonii* for solanin content.

271. STELZNER, G. 633.491:581.192:578.08
Die Bestimmung des Stärkegehaltes von Kartoffeln. (**The determina-
tion of the starch content of potatoes**).
Forschungsdienst 1943 : 16 : 189-91.

The author's method of starch estimation, described and compared with that of von Sengbusch, is stated to be quicker and less liable to error when unskilled labour has to be employed and therefore suitable for mass experiments. E. W.

272. HANSEN, H. R. and
NISSEN, M. 633.491:582(48.9)
Beskrivelse af Kartoffelsorter, dyrket i Danmark. (**Description of
varieties of potatoes grown in Denmark**).
Tidsskr. Planteavl 1945 : 49 : 559-663.

Information on the potatoes cultivated in Denmark is grouped under the following heads: outline of method and characters used in botanical description of varieties, with illustrations; a classification by earliness; varietal reactions to various diseases, with copious citations of relevant literature; and full varietal descriptions, giving origins and synonyms. A key for the determination of varieties and an alphabetical list of breeders' names and of the names of varieties are also included.

273. CÁRDENAS, M. 633.491:582(84)
Notas sobre taxonomía de plantas económicas de Bolivia. Algunas
especies bolivianas de *Solanum* (Sección *Tuberarium*) poco conocidas en
los herbarios. [**Notes on the taxonomy of economic plants of
Bolivia. Some Bolivian species of *Solanum* (Section *Tuberarium*)
little known in herbaria**].
Rev. Agric., Bolivia 1945 : 2 : No. 3 : 78-84.

Notes are presented on the little known potatoes *S. circaeifolium* Bitter, *S. violaceimarmoratum* Bitter and *S. violaceimarmoratum* var. *papillosum* Hawkes. A new semi-cultivated potato known as Lelekoya Choque is described. Two forms are known, Semillu with purple tubers, and Lelekoya proper with mottled white tubers.

274. 633.491-2-1.521.6(44)

Les maladies de la pomme de terre. (**The diseases of the potato**).

Minist. Agric. Ravitaillement, Paris 1943 : Pp. 67.

This general account of potato diseases includes descriptions of varietal susceptibility to the more important diseases treated.

275. KOLOTOVA, S. S. and VOLODIN, A. P. 633.491-2.112-1.521.6:581.02(47)

(**Intensifying the drought-resistance of potatoes before sowing them**).

Izvestija Biol. Naučno-issled. Inst. pri Molotovskom Gosud. Univ. imeni

M. Gorjko (Bull. Inst. Rech. Biol. Molotov) 1941 : 12 : 19-34.

Tubers of Early Rose, Epicure, Lorch, Seedling (Sejanec), Korenevskii, Silesia, Blue Giant, and Variegated (Pestraya), a local variety, were subjected to different conditions of light, temperature and drying before being planted. These influences, in various combinations and for various periods of time, were brought to bear upon the tubers while these were sprouting, and the physiological effects were observed. It was concluded that potato plants could be hardened against drought and cold by certain combinations of the treatments referred to above. Lorch and Silesia were the least responsive of the varieties tested. I. Z.

276. CRÉPIN, C. and BUSTARRET, J. 633.491-2.411.4-1.521.6:575.127.2

633.491-2.6-1.521.6:575.127.2

Quelques problèmes de l'amélioration de la pomme de terre. (**Some potato breeding problems**).

Acad. Agric. Fr. 1941 (1942) : Pp. 10.

Some progress has been made towards obtaining potato varieties resistant to blight and Colorado beetle by crossing German *Solanum demissum* x *S. tuberosum* hybrids with Cellini and Belle de Fontenay x Cellini.

277. BRUYN, H. L. G. DE 633.491-2.411.4-1.521.6:578.08

Methode voor het vaststellen van de vatbaarheidsgraad van aardappelknollen voor de aardappelziekte. (**Method for the determination of the susceptibility of potato tubers to late blight**).

Tijdschr. PlZiekt. 1943 : 49 : 77-99.

A new method has been developed by the author for testing the susceptibility of potato tubers to late blight (*Phytophthora infestans*). Briefly summarized, it consists in making, in the surface of the tuber, a circular wound about 5 mm. deep, with a 2 mm. cork borer, and introducing a zoospore suspension into the wound, after which the tuber is kept for 5 days in the dark; the tuber is then cut through the wound into two halves, the plug surrounded by the wound removed, and the two halves replaced again in the dark in a moisture saturated atmosphere, and kept at a temperature of 10° C. The susceptibility of the tubers is evaluated by the time required for the appearance of aerial mycelium of the fungus on the cut surfaces. Failure of the mycelium to develop within 17 days was assumed to denote the lowest degree of susceptibility of a given variety. V. A.

278. ARNAUD, G. 633.491-2.412.5-1.521.6(44)

La "gale noire" ou "galle verruqueuse" de la pomme de terre. (**Black scab or wart disease of the potato**).

Ann. Épiphyt. 1942 : 8 : 89-98.

Information is included on the varietal resistance to wart disease shown by French potatoes.

279. OORTWIJN BOTJES, J. G. 633.491-2.8-1.521.6(49.2)

De invloed van bladrolziekte op de opbrengst van verschillende aardappelrassen. (**The effect of leaf roll on the yield of different potato varieties**).

Tijdschr. PlZiekt. 1941 : 47 : 25-31.

Details are given of plot experiments in 1940 at Oostwold, Holland, to determine the effect of leaf roll on the yield of a number of potato varieties grown from seed tubers.

artificially infected by tuber grafting, or collected from naturally infected plants of the preceding crop. The results showed that, in both cases, the reduction in yield was insignificant or small in such varieties as Up to Date, Wilpo, Eigenheim, Noordeling, Bintje and Duiveland, but ranged from considerable to heavy in Voran, Ultimatus, Alpha, Red Star, Gloria, Beveland, Magneto, Industrie, Matador, Eersteling, Thorbecke, and heaviest of all in the Paul Krüger variety. Among the seedlings tested, Dorst N 130 and K 113 showed a very slight reduction in yield in the result of a single infection, while Mulder L 57 failed to yield completely. V. A.

280. FOLSOM, D. and STEVENSON, F. J. 633.491-2.8-1.521.6:575(74.1)
Resistance of potato seedling varieties to the natural spread of leaf roll.

Amer. Potato J. 1946 : 23 : 247-64.

Seedlings resistant to leaf roll were derived from crosses between resistant foreign potatoes and American commercial varieties. Seedlings from Imperia x Earleine, Kepplestone Kidney x Earleine and Houma x Katahdin were outstanding in resistance. In general, seedlings from crosses between certain of these resistant seedlings exhibited greater resistance than the hybrids from crosses involving only one resistant seedling. A table is included indicating the value of 50 commercial and seedling varieties in breeding for leaf roll resistance.

It was observed that the resistance of the seedlings to leaf roll depends upon the host resistance to the virus rather than upon resistance to the aphid vector.

FIBRES 633.5

281. SERDJUKOV, V. K. 633.5:581.6:578.08
(The technical analysis of fibre plants by means of small samples).
 Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 124-42.

The determination of the quality and yield of fibre plants by small samples enables the breeder to speed up his selection of the best and most productive varieties.

The method here described in detail is based on biological retting of whole stems with subsequent processing by laboratory machinery, following the lines of analysis used for large samples.

282. TER-AVANESJAN, D. 633.51:575.127.2:581.165.71(47)
(Grafting methods in cotton breeding).
 Doklady Vsesojuz. Akad. Seljsk. Nauk im. V.I. Lenina (Proc. Lenin Acad. Agric. Sci. U.S.S.R.) 1945 : Nos 4-5 : 34-35.

It is observed that the hybrid plants resulting from the first crossing of Egyptian and American cottons are more vigorous and give higher yields than either of the parent species. In the later hybrid generations, extreme segregation occurs, and in the F_2 and especially in the F_3 , the plants tend to be sterile or partly sterile, chlorotic and low yielding. Two experiments are shortly described showing how grafting can improve cotton. In the first experiment, F_1 hybrids, while still young, were grafted on Egyptian cotton as stock. The F_2 seed generation did not exhibit excessive segregation, and even in the F_3 generation there were several fertile plants of the Egyptian type which were superior to those of Egyptian cotton proper.

In the second experiment, Peruvian cotton, which in Taškent is late and poor yielding, was grafted on to the F_1 American and Egyptian hybrid. Seed of the F_1 generation produced abundant high yielding early plants I. Z.

283. PRESSLEY, E. H. 633.51:581.6:575.183
Estudio sobre el efecto del pólen en el largo de la fibra del algodón. (A study of the effect of pollen upon the length of cotton fibres).
 Rev. Fac. Nac. Agron., Colombia 1946 : 6 : No. 22 : 65-117.

This paper is a translation of an American original reviewed in *Plant Breeding Abstracts*, Vol. IX, Abst. 322.

284. SIMPSON, D. M. and
HERTEL, K. L. 633.51:581.6:581.02(73)
**Environmental modification of fiber properties as a source of error
in cotton experiments.**
J. Agric. Res. 1946 : 73 : 97-111.

Fibre length, uniformity in length, fineness and strength were analysed in samples of the following varieties: Seabrook (*G. barbadense* L.) and the Upland cottons (*G. hirsutum* L.) Acala, Stoneville 37, Rowden 42A, Coker 100 and Farm Relief. The results of the analysis indicated that environmental factors may mask heritable characteristics of the fibre, unless extreme care in field sampling is taken. Among the *G. hirsutum* varieties, intra-varietal variation caused by the environment frequently exceeded intervarietal genetical differences.

285. HUTCHINSON, J. B. 633.51:581.9(72.95)
The cottons of Puerto Rico.
J. Agric. Univ. P.R., 1944 : 28 : 35-42.

An account is given of the distribution of the perennial cottons, *G. hirsutum* var. *punctatum*, *G. hirsutum* var. *marie-galante* and *G. barbadense*, in Puerto Rico.

286. SIMPSON, D. M. and
WEINDLING, R. 633.51-2.3-1.521.6:575(73)
Bacterial blight resistance in a strain of Stoneville cotton.
J. Amer. Soc. Agron. 1946 : 38 : 630-35.

The bacterial blight resistant strain, Stoneville 20, has been isolated from Stoneville 2A. Selections of crosses between Stoneville 20 and susceptible varieties and back-crosses of the hybrids to the susceptible parents have been highly resistant, suggesting that the strain should be valuable in breeding for resistance.

287. SPARROW, F. K. 633.512.581.47:581.6:575.22(77.4)
Types of pods of *Asclepias syriaca* found in Michigan.
J. Agric. Res. 1946 : 73 : 65-80.

A description is given of 49 distinct types of pods of *A. syriaca* L., found among plants collected in the Lower Peninsula of Michigan. Pod type and floss characteristics are correlated, a fact which should facilitate selection for commercial purposes. The presence of a large number of different pod types within such a limited area suggests that they are primarily genetic variations. It is mentioned that the material investigated has in general exhibited complete self-incompatibility.

288. SIZOV, I. A. 633.52:575.12(47)
(Productive forms of flax obtained by hybridization).
Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry
Record) 1940 : No. 2 : 51-56.

The flaxes of the U.S.S.R. which comprise a great variety of forms and some Indian and Abyssinian forms, are described, with indications of their economically valuable characters. By hybridization of new high yielding forms, it is hoped to obtain new dual purpose forms which will have three to five productive stems from a single root.

Since 1935, breeding operations have been carried out, using as parents forms from Azerbaijan and Asia Minor, characterized by intensive stem formation, also large seeded forms with high oil content from the Mediterranean area and the Argentine, and fibre flaxes from northern parts. It is hoped to obtain fibre and oil flaxes combining the high yield of the southern forms with earliness and large seeds. The third and fourth generations have now been reached and the progeny are characterized by strong root systems and well-branched stems arising from the root. The F_1 plants proved similar in earliness to the earlier parent; in size of seed they approach the larger-seeded parents, though not quite equalling them. The F_1 is uniform in regard to ripening, length of stem and type of inflorescence.

The F_2 surpassed the parents in yield and luxuriant growth. Dual purpose flaxes were obtained from the cross of the large-seeded Sicily K-2530 x Asia Minor K-2769, a semi-winter type. Similar results were obtained on crossing northern fibre flaxes with winter

forms from Azerbaijan, and on crossing large seeded ones from Morocco and the Argentine with Turkish winter flaxes.

In discussing the occurrence of transgressive characters among the new forms, Mendelism and segregation are rejected as inapplicable to the case in hand. The author concludes that "evidently the biological peculiarities of the plant organisms and the conditions of hybridization and rearing of the hybrids determine the character of the progeny and its behaviour".

289. VOLKOV, A. 633.52:581.6(47)
(The structure of flax fibre in connexion with its place of origin).
 Socialističeskoe Seljskoe Hozjaistvo (Socialistic Agriculture) Moscow
 1946 : Nos. 1-2 : 54-56.

This is an analysis of the reports of several inter-departmental committees on the quality of flax fibre harvested in different regions of the Soviet Union. The output of combed fibre and the amount of waste were calculated, and the fibre quality was estimated according to the 1935 All-Union standard. It was found that variations affecting the yield of marketable standard fibre, as well as the amount of waste, were more or less constant for all varieties of flax grown in each particular region, and the conclusion is reached that flax produced in different geographical regions has distinctive technological characteristics. It is therefore suggested that further study should be made of factors influencing this variability, and also that steps should be taken to ascertain the precise location of flax producing high quality marketable fibre. H. F.

290. BORGES, M. DE L. V. 633.52-2.421.9-1.521.6(46.9)
 Uma doença do linho nova para Portugal. **(A flax disease new to Portugal).**
 Brotéria 1946 : 15 : 129-36.

Each of 15 Portuguese flax varieties tested exhibited susceptibility to pasmo disease [*Septoria linicola* (Speg.) Garassini] after inoculation.

291. HERMANN, F. J. 633.525.2:581.175.11:582(73)
The perennial species of *Urtica* in the United States east of the Rocky Mountains.
 Amer. Midl. Nat. 1946 : 35 : 773-78.

Taxonomic studies of *Urtica* were undertaken in view of the growing interest in the nettle as a source of chlorophyll. It has been found that species from the Pacific Coast are not adapted for production in the eastern United States; investigations were therefore confined to the perennial nettles east of the Rocky Mountains.

The perennial nettles of this region are classified under one species, *U. dioica* L., and the nettles which have previously been known as *U. procera* Muhl., *U. gracilis* Ait. and *U. viridis* Rydb. are grouped together as *U. dioica* var. *procera* (Muhl.) Wedd.

292. BALL, C. R. 633.584.3:582:001.4
***Salix floridana* Chapman, a valid species.**
 J. Arnold Arbor. 1943 : 24 : 103-06.

The very rare willow, *S. floridana*, is a valid species distinct from *S. longipes* Shuttleworth. *S. astatulana* Murrill et Palmer is a later synonym.

SUGAR PLANTS 633.6

293. GRASSL, C. O. 633.61:575.127.5:582
***Saccharum robustum* and other wild relatives of "noble" sugar canes.**
 J. Arnold Arbor. 1946 : 27 : 234-52.

A diagnosis is given of the wild sugar cane *S. robustum* which has not yet received a formal description. Consideration is then given to its relationships with *S. spontaneum* L. and *S. edule* Hassk., and to the general problem of the origin of the noble canes, which, it is suggested, arose principally from hybrids of *S. robustum* and *Erianthis maximus*. This hybridization probably occurred in the Fiji Islands and in New Caledonia, while back-crossing of the primary hybrids to *S. robustum* may have taken place in New Guinea.

294. ALVAREZ, A. S. 633.61:581.6

¿El jugo de caña despues de clarificado aumenta o disminuye en pureza?

(Does cane juice become more pure or less pure after refining?)

Bol. Estac. Agríc. Tucumán 1946 : No. 57 : Pp. 11.

Information is presented to show that the juice of some sugar cane varieties becomes purer after refining, while in other varieties the reverse holds true. In some cases, an increase or diminution in purity may be obtained according to the method of refining used.

295. CROSS, W. E. 633.61:581.6(82)

Variedades de caña importadas. (Imported sugar cane varieties).

Rev. Industr. Agríc. Tucumán 1945 : 35 : 241-97.

Extensive details are given on the yielding ability and quality of the following varieties: Agaúl, Bambú de Tabandí, Co.270, Co.281, Co.284, Co.289, Co.290, Co.399, Co.413, Co.421, Co.508, four unnumbered Co. varieties, C.P.807, C.P.28/11, C.P.28/19, C.P.29/116, C.P.29/320, Kavangire, Oshima, P.O.J.161, P.O.J.1337, P.O.J.1507, P.O.J.2714, P.O.J.2725, P.O.J.2727, P.O.J.2878, P.O.J.2883, P.O.J.2946, P.O.J.2947, P.O.J.2952, P.O.J.2961, "Santa Rosa," S.P.I.33.243, Uba Brandes, Uba de Puerto Rico, Yon Tan San and Zwinga.

296. AGETE, F. 633.61:581.6:575.12(72.91)

Buscando nuevas cañas para Cuba. (Searching for new canes for Cuba).

Rev. Minist. Agríc. Cuba 1946 : 29 : 72-76.

Details are given on the quality and other characters of the many new sugar cane varieties produced in the Cuban sugar cane breeding programme. The parentage of the new forms is indicated when known.

297. ORJUELA NAVARRETE, J. E. 633.61-2.3-1.521.6

La enfermedad "red stripe" de las hojas de la caña de azucar en Colombia.

(The red stripe disease of the leaves of cane sugar in Colombia).

Agricultura Trop., Bogotá (Supl.) 1946 : 2 : No. 4 : 23-37.

In this article, a useful summary is included of information relating to varietal differences in susceptibility to red stripe (*Phytophthora rubrilineans* Lee et al.).

298. CROSS, W. E. 633.61-2.451.2-1.521.6:581.6(82)

Las cañas "tucumanas" de semillero. Resultados obtenidos hasta la cosecha de 1944 inclusive. (The Tucumán canes. Results obtained up to the 1944 harvest inclusive).

Rev. Industr. Agríc. Tucumán 1945 : 35 : 55-221.

Extensive details are presented on the sugar yield, quality and smut resistance of the following Tucumán seedlings: 379, 630, 1111, 1118, 1132, 1139, 1149, 1160, 1184, 1190, 1199, 1220, 1231, 1238, 1296, 1316, 1358, 1376, 1400, 1406, 1422, 1590, 1596, 1854, 1980, 2039, 2603, 2605, 2611, 2613, 2622, 2631, 2634, 2636, 2645, 2651, 2657, 2668, 2680, 2681, 2683, 2692, 2698, 2699, 2700, 2701, 2702, 2703, 2704, 2705, 3015, 3026, 3085, 3142, 3174, 3179, 3204, 3253, 3303, 3342, 3349, 3373, 3496, 3515, 3525, 3580, 3590, 3591, 3603, 3663, 3723, 3828, 3875, 3903, 3942, 3950, 3987, 4036, 4050, 4070, 4157, 4231, 4268, 4295, 4316, 4356, 4360, 4363, 4398, 4401, 4437, 4441, 4445, 4493, 4505, 4535, 4547, 4570, 4600, 4617, 4619, 4624, 4692, 4712, 4717, 4724, 4747, 4750, 4753, 4762, 4764, 4832, 4843, 4846, 4852, 4874, 4885, 4913, 4915, 4923, 4950, 5034, 5056, 5122, 5142, 5217, 5227, 5234, 5245, 5247, 5249, 5261, 5336, 6056, 6088, 6094, 6101, 6161, 8011, 8099, 8316, 8369, 8409, and 8438.

299. GOUAUX, C. B. 633.61.00.14(76.3)

Some comparative averages and results of sugar cane test fields.

Sug. Bull. N.O. 1946 : 24 : 200-03.

Data are given on the performance of important commercial sugar canes and promising unreleased seedling varieties in trials carried out at the eight test field locations of the Louisiana Experiment Station during 1944-45.

300. GREAVES, C. and
MOLINET, G. 633.61.00.14(87)
Proyecto de la caña de azúcar. (**The sugar cane project**).
3ª Conf. Interamericana Agric., Caracas 1945 : Pp. 71.

Information is included on the sugar yields of the various varieties grown in Venezuela.

301. BENTANCUR, M. O. 633.62:575.12(89)
El sorgo azucarado (*Andropogon Sorghum* var. *saccharatum* Korn).
[**Sweet sorghum** (*A. Sorghum* var. *saccharatum* Korn)].
Rev. Fac. Agron. Univ. Montevideo 1945 : No. 41 : 87-105.

The behaviour of the sweet sorghum varieties Norkan, Leoti Red, Rox Orange, Early Sumac, Russ Orange, Atlas and Kansas Orange in Uruguay is described. A note is also added on the technique of intervarietal hybridization and selection.

302. PEDERSEN, A. 633.63:575.11.061.6:578.08
Om Bederoernes Farver. (**On the colours of beetroots**).
K. VetHøjsk. Aarskr. 1944 : 60-111.

A detailed survey is given of the results of research by previous workers and by the writer on colour in beets, treated from two aspects: (1) the genetical and practical consequences in seed production and breeding; and (2) the use of colours of germinating seedlings in the laboratory under different conditions of temperature and light for determining authenticity in seed control. Some useful data hitherto unpublished are cited from the results of Lindhard, Iversen and Keller, in a detailed comparison with the writer's findings. The writer's own investigation is concerned mainly with questions of practical interest, and genetic analysis has not therefore been carried through in all cases to substantiate the genotypic formulae and linkage relations. Methods of hybridization are described. The analysis of colour types in the beet genus is based chiefly on the surface colour of the body of the root, but the colour of the flesh and tops is considered incidentally, e.g. the occurrence of red in the main shoot of white forms and in certain yellow beets, resulting in a pronounced coloration in seedlings and serving as an indication of hybridity in white forms.

Using the following symbols, *G* for yellow and *R* for red, white root colour is represented by *rrgg*, *Rrgg* or *RRgg*; yellow by *rrGG* and *rrGg*; and red by *RRGG*, *RRGg*, *RrGG* or *RrGg*. The author's experiments included mainly sugar beet, white sugar mangel, rose sugar mangel, Barres, yellow Eckendorfer, Elvetham (Mammut), red beet and Garton's White Knight. The results of crosses with sugar beet and red beet agreed closely with Lindhard's findings.

Hybridization with the other types revealed the following genotypes *inter alia*: Elvetham, *RRGG* with close linkage between *R* and *G*; rose sugar mangel, *R₁R₁gg*, *R₁* being dominant to *r* and producing rose in the absence of *G* but dark red when *G* is present; Eckendorfer, *rrGG*, *R₂rGG* or *R₂R₂GG*, the gene *R₂* having a similar effect to *R* in white beets, producing red hypocotyl in seedlings and red colour in the central bud of full grown plants, and being closely linked with *G*. Germination tests in the laboratory with ten varieties of the yellow Eckendorf type showed from 17.8% to 59.4% of the recessive genotype *rrGG*.

The *R* factors are regarded as multiple allelomorphs, Keller's *R* being a fifth allelomorph in the series *RR₁R₂r*.

The proportion of the genotypes *rrgg*, *Rrgg* and *RRgg* in white beets and *rrGG*, *R₂rGG* and *R₂R₂GG* in yellow beets of the Eckendorfen type can be expected to keep nearly constant from year to year within the same strain. Only by close selection in stock seed growing or by breeding can the proportion be altered considerably. The percentage of the recessive yellow seedling type ascertained by germination tests in the laboratory may provide a valuable characteristic for testing genuineness of strain.

The colour of the hybrids arising from contamination in seed fields is indicated. When white beet or yellow Eckendorfer is one of the parents in the cross, there will be two types of hybrids. The proportion of these may be calculated when the percentage of the recessive type in white beet and Eckendorfer is known.

When breeding new strains from a cross between parents of different colour types, it may be difficult to get strains true to one colour type. By crossing, for instance, Barres (*rrGG*)

with sugar beet it will be easy in this as in other crosses to get white strains; it is fairly easy to get yellow or rose coloured strains, but very difficult to get dark red. Crosses with White Knight have given aberrant results for which possible explanations are suggested.

According to germination tests the types of beet in the author's experiments can be separated on the basis of seedling colour.

Excellent coloured illustrations provide additional support for the results cited.

303. BOUGY, E. 633.63:581.6:575.12
Dissociation en F_4 de l'hybride Vauriac x Vilmorin A. (**Segregation in the F_4 of the hybrid Vauriac x Vilmorin A**).
Publ. Inst. Belge Amélior. Better. 1945 : 13 : 195-200.

Progenies of the sugar beet cross Vauriac x Vilmorin A have now been followed to the F_4 stage (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1833). Details are given on the sugar content and root weight of the segregates.

304. ERNOULD, L. 633.63:582
Les espèces botaniques du genre *Beta*. (**The botanical species of the genus *Beta***).
Publ. Inst. Belge Amélior. Better. 1945 : 13 : 219-53.

A valuable monographic treatise on the genus *Beta* is presented. The species recognized are *B. lomatomogona* Fisch. et Mey., *B. trigyna* Waldst. et Kit., *B. corolliflora* Zoss., *B. intermedia* Bunge, *B. nana* Boiss. et Heldreich, *B. macrorrhiza* Stevens, *B. vulgaris* L., *B. patellaris* Moq., *B. procumbens* Smith and *B. Webbiana* Moq. Maps illustrating the geographical distribution of the various species are included, and a concluding section lists the potentially useful economic characters to be found in the several wild forms.

305. CROIZAT, L. 633.682:582(73)
A study of *Manihot* in North America.
J. Arnold Arbor. 1942 : 23 : 216-25.

The inter-relationships of the following species of *Manihot* are discussed: *M. carthagenensis* (Jacq.) Muell.-Arg., *M. gualanensis* Blake, *M. aesculifolia* (H.B.K.) Pohl, *M. rhomboidea* Muell.-Arg., *M. ludibunda* sp. nov., *M. parvicocca* sp. nov., *M. mexicana* Johnst., *M. intermedia* Weatherby, *M. colimensis* sp. nov., *M. chlorosticta* Standley et Goldm., *M. rubricaulis* Johnst., *M. isoloba* Standley, *M. angustiloba* (Torrey) Muell.-Arg. and *M. Davisiae*. Many of the forms coming under these species have been confused with *M. carthagenensis*, a species which does not extend into the U.S.A.

STIMULANTS 633.7

306. ALLEMANN, O. 633.71:575(49.4)
Einige Notizen über den schweizerischen Tabakanbau. (**Some notes on Swiss tobacco cultivation**).
Schweiz. landw. Mh. 1945 : No. 6 : 161-68.

The species *Nicotiana rustica* comprises six varieties. From these, land varieties have been developed, e.g. Austrian Bauerntabak, Russian Mahorkatabak, Hungarian Veilchentabak and varieties from the Amazon regions, Canada and China. From the species *Nicotiana Tabacum*, six varieties have evolved, from which the Oriental, North American, Central American, South American and Asiatic cultivated races have been produced by hybridization or as pure types. Seven important varieties of tobacco grown in Switzerland are described, including some which have been bred there. E. W.

307. GOODSPEED, T. H. 633.71:576.312.3:576.16:582
Chromosome number and morphology in *Nicotiana*. VII. Karyotypes of fifty-five species in relation to a taxonomic revision of the genus.
Univ. Calif. Publ. Bot. 1945 : 18 : 345-68.

An account is given of the chromosome number and morphology of 55 of the 58 recognized species of *Nicotiana*. The significance of caryotype in tracing the possible origin of

Nicotiana species and in establishing the taxonomic divisions of the genus is discussed. In general, the data on meiosis and chromosome morphology confirm the taxonomical classification.

308. GOODSPEED, T. H. 633.71:582
Studies in *Nicotiana*. III. A taxonomic organization of the genus.

Univ. Calif. Publ. Bot. 1945 : 18 : 335-44.

Classificatory systems of the genus *Nicotiana* are reviewed, and a revised classification is presented in which the genus is divided into three subgenera, *Rustica*, *Tabacum* and *Petunioides*, comprising 11 sections. The classification differs in certain respects from that of Kostoff (cf. *Plant Breeding Abstracts*, Vol. XVI, p. 374).

309. KIGHTLINGER, C. V. 633.71-2.484-1.521.6:575(73)
Black root rot resistant strains of Havana seed tobacco for the Connecticut Valley.

Bull. Mass. Agric. Exp. Sta. 1946 : No. 432 : Pp. 20.

The black root rot resistant strains of Havana Seed tobacco, Havana 211 and Havana K2, are described. Havana 211 was developed as a result of co-operative breeding work in the Connecticut Valley and Wisconsin, from a cross between Havana 38 and the black root rot resistant strain Page's Comstock. Havana K2 was bred in Massachusetts by crossing the Havana Seed tobacco, known locally as the Sandman strain, and Havana 211, and back-crossing to Havana Seed. Data are given on the performance of the two strains in the Connecticut Valley in comparison with Havana Seed (Brown strain) and Havana 142.

310. CLAYTON, E. E. and GRAHAM, T. W. 633.71-2.6-1.521.6:575
Tobacco resistant to root knot and nematode root rot.

Phytopathology 1946 : 36 : p. 684. (Abst.).

The selection T.I. 706 has proved to be highly resistant to both *Heterodera marioni* and *Pratylenchus* sp. Lines as resistant as T.I. 706 have been obtained from hybrids between the selection and susceptible tobaccos, and in the first and second back-crosses. Some F₄ back-cross lines homozygous for resistance were secured.

311. GERSTEL, D. U. 633.71-2.8-1.521.6:576.354.4:575.127.2
Inheritance in *Nicotiana Tabacum* XXI. The mechanism of chromosome substitution.

Genetics 1946 : 31 : 421-27.

The author has recently shown (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 397) that a chromosome of *N. glutinosa* had been substituted for one of *N. Tabacum* in breeding the mosaic resistant variety Holmes Samsun. The present paper reports the investigation of the mechanism of the substitution. It is suggested that such a substitution may occur in plants which have two full sets of *N. Tabacum* chromosomes and one or more *N. glutinosa* chromosomes. In these plants meiotic irregularities, such as non-conjunction between the chromosomes of a *N. Tabacum* pair or the formation of trivalents between a univalent of *N. glutinosa* and a pair of *N. Tabacum* chromosomes, may cause the production of gametes with only 23 *N. Tabacum* chromosomes, and one or more *N. glutinosa* chromosomes. A homologous *N. glutinosa* chromosome may then take the place of the *N. Tabacum* chromosome. Some cytological evidence of the formation of trivalents was obtained from plants bearing one *N. glutinosa* chromosome and two *N. Tabacum* sets. Indirect evidence of the mode of substitution was also secured from the breeding behaviour of trisomic plants and a pentaploid having 24 pairs of *N. Tabacum* chromosomes and 12 *N. glutinosa* univalents.

312. STEHLÉ, H. 633.73:575(72.97)
La culture du café à la Martinique et son amélioration. (The cultivation of coffee in Martinique and its improvement).

Bull. Agric. Martinique 1941 : 10 : 98-139.

This survey includes a brief description of the coffee varieties grown in the French Antilles, and suggests how selection and hybridization might be used in their improvement.

313. CASSAGNOL, P. L.,
BONCY, F. and
DENIS, A. 633.73:581.6(72.94)
Etude sur la qualité des cafés d'Haiti. (**Study of the quality of the coffees of Haiti**).
Bull. Dep. Agric. Haiti 1943 : No. 25 : Pp. 53.
The quality of the coffees produced in Haiti is discussed with reference to the various localities in which they are grown.
314. MONNIER, P. 633.74-2.8-1.521.6(66)
Une nouvelle maladie à virus du cacaoyer en Afrique occidentale: le swollen shoot. (**Swollen shoot, a new virus disease of cacao in western Africa**).
Rev. Bot. Appl. 1946 : 26 : 166-73.
This review summarizes recent work on the swollen shoot disease of cacao. Special reference is made to the studies of Posnette on varietal resistance (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 61).
315. ALIBERT, H. 633.74-2.8-1.521.6(66.7)
Note préliminaire sur une nouvelle maladie du cacaoyer le "swollen shoot". (**Preliminary note on swollen shoot, a new disease of a cacao**).
Agron. Trop. 1946 : Nos. 1-2 : 34-43.
It is mentioned in this short review that some trees unattacked by the swollen shoot virus are being tested to see whether they are in fact resistant. Reference is made to Posnette's researches on varietal resistance (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 61).

OIL PLANTS 633.85

316. BUSTARRET, J. and
JONARD, P. 633.85(44)
Observations sur la culture et la sélection de quelques plantes oléagineuses. (**Observations on the cultivation and choice of some oleiferous plants**).
Ann. Agron., Paris 1944 : 1-21.
Notes are given on French varieties of colza, rape, black and white mustards, *Camelina*, poppy, sunflower, *Carthamus*, soya bean, linseed and a few other minor oil plants.
317. 633.853.74:581.47:575.11
LANGHAM, D. G. 633.853.74:575.11.061.633
Genetics of sesame. III. "Open sesame" and mottled leaf.
J. Hered. 1946 : 37 : 149-52.
In breeding sesame in Venezuela, search has been made for an indehiscent or semi-dehiscent type of seed-pod suitable for mechanical harvesting. A plant with leaves cupped upwards and indehiscent pods was isolated from an F_5 hybrid between Criollo and Selection 5. The data from crosses between the progeny of this plant and Selection 43-71 showing the normal dehiscent character showed that the indehiscent seed pod is inherited as a simple Mendelian recessive character. The designation *Id id* is suggested for the factor pair determining dehiscence. In addition to the cupped character of the leaves, plants homozygous for *id* are 30% sterile, due to the presence of curved styles. In the F_2 generation, however, some segregates with less leaf cupping and nearly straight styles were obtained.
Plants with yellow blotches on the leaves were observed in the F_3 of a cross between White Sesame India and Selection 5. The character is inherited as a simple Mendelian recessive, and the symbols *M m* are suggested for the factor pair concerned. The character can be easily identified, and the loss of chlorophyll is not sufficient to affect plant vigour; the character should therefore be useful in genetical studies.

318.

MOROZOV, V. K.

633.854.78:575(47)

633.854.78-1.531.12(47)

(Seed production and breeding of the sunflower).

Naučnyĭ Otčet Inst. Zernovogo Hozjaĭstva Jugo-Vostoka SSSR za 1941-42 gg. (Sci. Rep. Inst. Grain Husbandry South-Eastern USSR for 1941-42) 1944 : 190-208.

The production of seed of the variety Saratov 169 according to the scheme drawn up by the Agricultural Commissariat is described. Some recent élites appear to yield more and contain more oil in the seeds.

The aims in breeding are high yield and oil content, resistance to *Orobanche*, drought and diseases, and suitability for mechanized harvesting. Inbreeding, as a method, has been completely rejected in favour of repeated individual selection with extensive use of populations derived from material very much alike as regards useful economic characters, but differing in origin. Also, the plots where the selected characters are fixed, and where judging and breeding operations are completed, are situated at a considerable distance from the breeding plots.

Since 1938 the following varieties superior in oil yield to Saratov 169 have been produced: Saratov 19, a selection from Saratov 169/1; Mestnyĭ Romanovskii (Local Romanovskii) and P-10, which, during three years, yielded considerably more oil per ha. on the average than the standard Saratov 169. The variety R-27, bred for earliness, has surpassed other early varieties in yield of seed and oil, giving 20% more oil than Early Saratov.

The above mentioned method of individual selection was also applied to the breeding of sunflowers with edible seeds, which, though possessing various undesirable features, comprise varieties with high seed fertility and a high 1000 corn weight, both useful features for the creation of new varieties superior in yield of seed and oil. The variety Saratovskii Gryzovoi (Saratov Edible) has been produced, and, to increase the oil content, has been crossed with lines 3519, 19, 808 etc. with high oil content, resulting in the population P-3, from which forms of the desired type are being selected as well as forms with high oil content combined with larger seeds.

The establishment and improvement of local varieties are also proceeding. It should be possible genetically to combine high yield with high oil content. The reasons for the failure in the U.S.S.R. during the last 20 years to obtain higher yielding varieties are examined, and suggestions are offered regarding the method of spatial isolation to be adopted in working with sunflowers. The method of "halves" based on "formal" genetics is rejected. As regards selection, it is recommended that populations, similar in the main characters but of different origin, should be used to ensure vigorous progeny.

MEDICINAL PLANTS 633.88

319.

EFIMENKO, O. M.

633.885.1:581.192:578.08

(A micro-chemical study of the cinchona tree).

Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 151-58.

As an aid in *Cinchona* selection, the writer has devised an improvement of the iodine reaction for detecting alkaloids in this plant. He uses a 1% solution of iodine in potassium iodide with preliminary treatment of the leaf sections with 10% caustic soda to eliminate extraneous substances that otherwise would absorb the reagent.

Leaves of *Cinchona Ledgeriana* contain less alkaloids than those of *C. succirubra*. Young leaves of both species contain considerably more alkaloids than old leaves, and the content diminishes gradually from the leaves of the upper part of the plant to the lower leaves. In the bark this relationship is reversed, the content increasing from the younger growing zone to the older parts. The maximum amount accumulates in the bark.

Roots of the first order are rich in alkaloids. The reaction was absent in young, thin roots. The presence of various other alkaloids was recorded in addition to the main ones.

The micro-chemical findings were confirmed by macro-analysis.

RUBBER PLANTS 633.91

320. SCHULTES, R. E. 633.912:581.9(86)
 Estudio preliminar del género *Hevea* en Colombia. (**Preliminary study of the genus *Hevea* in Colombia**).
 Rev. Acad. Colombiana Cienc. Exactas 1945 : 6 : 331-38; also Rev. Fac. Nac. Agron., Colombia 1946 : 6 : No. 22 : 18-45.

The *Hevea* species believed to be indigenous in Colombia are described, and notes are added on their degree of variation and geographical distribution within Colombia.

321. GIRALDO H., C. 633.912-2.421.9-1.521.6
 Adelanto en la recolección de semillas resistentes de caucho. (**Progress in collecting resistant seeds of rubber**).
 Agricultura Trop., Bogotá 1946 : 2 : No. 4 : p. 21.

Three and a half tons of seed of *Hevea brasiliensis* var. *concolor* resistant to *Dothidella Ulei* have been collected in the region of Leticia.

322. LANGFORD, M. H. 633.912-2.421.9-1.521.6(72.9+8)
 Regional differences in resistance of *Hevea* selections to South American leaf blight.
 Phytopathology 1946 : 36 : p. 686. (Abst.).

Hevea rubber seedlings and clones from different parts of the world were tested for resistance to *Dothidella Ulei* in widely scattered tropical American nurseries during a five-year period. The tests demonstrated the need of resistance tests in more than one locality for reliable selection work.

323. ANDERSSON, G. 633.913:575.42(48.5)
 Möjligheterna för en svensk produktion av naturgummi. (**The possibilities of natural rubber production in Sweden**).
 K. LantbrAkad. Tidskr. 1946 : 85 : 269-82.

Following general observations on the rubber production problem in Sweden and other countries, the work already done on various *Taraxacum* spp. as sources of latex is described. The economic aspect, soil requirements and methods of cultivation are considered at length. From the account given, selection work since 1944 in Sweden would seem to have been effective in raising the rubber content. Other possible methods of breeding higher yielding types are also mentioned, e.g. hybridization, polyploidization and X-ray induction of mutation.

The research is to be continued and it is suggested that cultivation on a small scale should also be promoted for the purpose of verifying the experimental results.

324. KAZAKEVIČ, L. I. 633.913:575.42:581.6(47)
 (**The cultivation of rubber-bearing plants in the South East**).
 Naučnyi Otčet Inst. Zernovogo Hozjaistva Jugo-Vostoka SSSR za 1941-42 gg. (Sci. Rep. Inst. Grain Husbandry South-Eastern USSR for 1941-42) 1944 : 66-85.

The development of krym-saghyz and kok-saghyz cultivation in south-eastern Russia is treated in some detail with a brief section on the importance of the choice of varieties. A new krym-saghyz variety, Kaunčinskii I, appears promising in yield of root and seed, and also does not appear to relapse into a resting stage in its first year; in variety trials in 1942 it also gave good results and it is hoped that its high rubber content, 1.79% in the root in the first year, and winter hardiness will be confirmed by experiments in progress. The very heterogeneous populations of kok-saghyz, of which no actual varieties have yet been evolved, were undergoing the initial stages of selection for productivity and rubber content in 1941. Figures showing interim results are given.

325. KOROLEVA, V. A. 633.913:576.312.35
 633.913:582
 (**Biological features of kok-saghyz and of the non-rubber-bearing dandelions infesting plantations**).
 Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 12-31.

Embryological and cytological studies have been made of ten species of *Taraxacum*,

including *T. Kok-saghyz*, and full descriptions are given of their morphology and biology, to assist in identifying the non-rubber-bearing forms. *T. multiscaposum* and *T. bessarabicum* had 16 diploid chromosomes. The first is cross-pollinating and the second self-pollinating. The remaining species reproduce apomictically.

Hybridization and interspecific hybrids between various species and kok-saghyz were also investigated, and it was found that in the main the flowering times do not coincide, that of the dandelions being earlier than kok-saghyz.

T. calcareum has 32 chromosomes, *T. brevicorniculatum* 24 and *T. officinale*, 24. Pollination of kok-saghyz by *T. brevicorniculatum* gave rise to a progeny containing seven plants of paternal type. They were sterile.

326. BERGNER, A. D. 633.913:576.356.5:576.354.4(73)
Polyploidy and aneuploidy in guayule.

Tech. Bull. U.S. Dep. Agric. 1946 : No. 918 : Pp. 36.

Investigations are reported on polyploidy in guayule collections from Texas and Mexico, in commercial strains, and in the progeny obtained by controlled and uncontrolled pollination of selected plants. The material from Mexico included diploid ($2x = 36+$), triploid ($3x = 54\pm$) and tetraploid ($4x = 72\pm$) stands; the Texan guayule consisted entirely of stands with a chromosome number of $4x = 72\pm$. Commercial strains with $2n = 54\pm$ and $72\pm$ were studied. Individual plants with chromosome numbers higher than $2n = 72\pm$ occurred among the triploid and tetraploids of the Texan and Mexican collections; these were mostly "aberrants".

Details are given of meiosis in the pollen mother cells of haploids, diploids and the polyploid series. "Intermediates" were characterized by more multivalents at metaphase I than plants of the "good" guayule type, and showed more lagging chromosomes at anaphases I and II; many microcytes were observed among the pollen grains of the intermediates. The chromosome numbers of the functional pollen grains produced by triploids, tetraploids and aberrants were determined. The numbers were $2n = 22-30$ and $2n = 33-36$ for $3x$ and $4x$ plants, respectively; for aberrants from $3x$ and $4x$ plants, the chromosome numbers were respectively $2n = 38-43$ and $2n = 48-55$.

In triploid and tetraploid populations, facultative apomixis, the predominant mode of reproduction in these polyploids, tends to maintain euploidy. Individual variants, however, originate as the result of normal macrosporogenesis and amphimixis, which occur to a limited extent. These variants are morphologically distinct types, including haploids, off-type normals and aberrants. Most of the off-type normal plants proved to be aneuploids, with chromosome numbers of $2n = 54-66$ and $2n = 65-75$. All the aberrants possessed high chromosome numbers; aberrants derived from triploids had a chromosome number of $2n = 80-93$, while those from tetraploids had $2n = 99-120$. Aberrants were produced as the result of self or cross pollination of triploids and tetraploids, with either guayule or mariola as pollen parent. Sectorial chimaeras were fairly common among aberrant plants, particularly after the first year of growth. Aberrants appear to arise in $3x$ and $4x$ populations by non-reduction of the egg following fertilization, and subsequent apomixis. A small number of off-type normals with $2n = 74-93$ observed among the progeny of aberrant plants probably also arose through abnormal amphimixis; these plants had only a few of the phenotypic characters of the aberrants, which suggests that they possessed a more successful genic balance, in spite of their high chromosome numbers.

327. MARKOVA, L. G. 633.913:581.16
(An embryological study of guayule and related species).

Botaničeskii Žurnal (J. Bot. U.R.S.S.) 1946 : 31 : 19-26.

The development of the embryo-sac was examined in seven varieties of *Parthenium argentatum* and in *P. incanum* and *P. Hysteropus*. Apomixis and other reproductive abnormalities were observed; they were all found in the late stages of the development of the embryo-sac. Such abnormalities are believed to be due to the hybrid origin of the *Parthenium* species.

328. MYNBAEV, K. 633.913:581.165.1:581.6
(Intra-clonal variation of morphological features and rubber content in kok-saghyz in relation to conditions of growth).
 Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 32-39.

On the basis of his own experimental observations, the author formulates his views on the effect of the environment on material of kok-saghyz from the standpoint of the yield of rubber. Before breeding operations are undertaken, the amount of variation in morphological features, latex content and root weight must be studied in relation to growth conditions. The experiments demonstrated effects of light, shade and nutrition upon both clonal and seed progenies.

FRUITS AND NUTS 634

329. ÖSTLIND, N. 634.1:581.165.711:575
 634.1-2.111-1.521.6
 Om grundstamar för äpple och päron. **(On stocks for apple and pear).**
 Sverig. Pomol. Fören. Årsskr. 1944 : 45 : 5-15.

The need for cold resistant stocks and the genetical complications in breeding apple and pear stocks from seed are referred to. The relative value of *Malus prunifolia* and *M. baccata* as investigated in the U.S.S.R. is mentioned.

330. KEMMER, E. and 634.1:581.165.711:576.356.5
 SCHULZ, F. 634.1-2.111-1.521.6
 Kärnstammens betydelse som underlag. **(The importance of the seedling as a stock).**
 Sverig. Pomol. Fören. Årsskr. 1944 : 45 : 141-45.

This discussion is a continuation of that reviewed in *Plant Breeding Abstracts*, Vol. XVI, Abst. 1393, but in this case it is confined to apples and pears.

331. SCHMIDT, M. 634.1-2.111-1.521.6:575
 634.2-2.111-1.521.6:575
 Beiträge zur Züchtung frostwiderstandsfähiger Obstsorten. **(Contribution to the breeding of frost resistant kinds of fruit).**
 Züchter 1942 : 14 : 1-19.

A large number of older pome and stone fruit seedlings of bearing age was compared with the parent forms as regards frost resistance. Lists are given of the varieties of apple, pear, cherry and plum used. Apple seedlings provided the largest amount of material. The progenies showed that the degree of sensitivity to frost determined for the original forms is a property conditioned by the genotype and that many apple varieties transmit to their progeny their own typical reaction to frost. The results give a picture of the value of certain varieties for breeding for frost resistance, and show that, for apples, it is useless to try to breed for frost resistance by interspecific hybridization.

The result, that the varietal reaction to frost is conditioned by the genotype, is taken to apply also to other genera. The prospect for selecting frost resistant forms of progenies of cultivated varieties is far less favourable for pears. In the case of cherry and plum seedlings, forms were selected which combined sufficient frost resistance with the desired quality of the fruit. E. W.

332. NEWCOMER, E. H. 634.11:575.252:576.354.4
 634.11:576.312.35
Studies in the nature of the clonal variety. IV. Cytological studies of bud sports of McIntosh, Stark and Baldwin apples.
 Tech. Bull. Mich. Agric. Exp. Sta. 1943 : No. 187 : Pp. 23.

Bud sports of the McIntosh, Stark and Baldwin apple varieties were found to be caused by structural chromosomal changes in the somatic tissue, combined with somatic segregation.

A discussion is given of the genetics of the Pomoideae. The primary multivalent pairing observed in certain of the McIntosh selections is attributed to structural hybridity involving interchanges of segments between otherwise non-homologous chromosomes. The hypothesis of the secondary basic chromosome number of 17 in the Pomoideae is discussed in relation to the possible occurrence of aneuploidy, and the chromosome number of $2n = 42$ reported by the author for the Stark variety. It is suggested that, meiotically, the bud sports represent an intermediate stage between sexual and asexual reproduction.

333. SCHMIDT, M. 634.11:575.255
 Ein Fall gehäufte Chimärenbildung beim Apfel. (**A case of formation of chimaeras in large numbers in the apple**).
 Züchter 1942 : 14 : 112-17.

A Kaiser Wilhelm seedling gave 26 apples of which 14 had formed chimaeras; others were probably overlooked in gathering.

The genotype of this seedling produces a deep red surface colour over the greenish-yellow ground of the fruit. The area and depth of colour of the red depends on environmental factors, especially sunlight. The fourteen chimerical apples are described and compared with a normal fruit, which is dark red. In all the chimerical fruits the red covering colour is sectorially altered to greenish-yellow. The author states that nowhere in the relevant literature has he seen a case of so many mericlinal chimaeras appearing on one tree. In the majority of cases of sectorial colour change in the apple, the sector is dark red; Shamel and Pomeroy's monograph on bud mutation in the apple (cf. *Plant Breeding Abstracts*, Vol. III, Abst. 111) gives only three cases of change from red to green.

The author considers the formation of the red fruit colour to be due to the activity of a large number of genes for anthocyanin formation, which are apparently dominant. Nevertheless, somatic mutation of fruit colour in the apple occurs far oftener from recessive to dominant than in the reverse direction.

In the case of the Kaiser Wilhelm seedling, the mutations were not only uniform as regards appearance but also as regards the manner of origin. Apart from the fact that the strength of the red colour on the changed sectors can undergo modifications, it seems possible that the mutation process in the individual chimaeras has in a varying degree caused loss of the capacity for masking the basic colour with anthocyanin. The author suggests that the differences in the strength of the covering colour in the affected sectors depends on which and how many genes for anthocyanin formation undergo mutation; gene lability might also be concerned. E. W.

334. NILSSON, F. and 634.11:576.356.5(48.5)
 LARSSON, G.
 Nya tetraploider av äpple vid Balsgård. (**New tetraploids of the apple at Balsgård**).
 Sverig. Pomol. Fören. Årsskr. 1944 : 45 : 123-29.

Previous work from recent Scandinavian sources on polyploidy in apples is referred to and an account is given of present progress in the artificial production of polyploid forms and of the frequency of tetraploids in the progeny of different varieties used as female parents. The identification of tetraploids by their morphological and cytological features is also exemplified in the light of recent experimental results (cf. Abst. 336).

335. 634.11:576.356.5:575(48.5)
 NILSSON, F. 634.54:576.356.5:575(48.5)
 Balsgårds Frukttärdsförädlingsanstalt. (**The Balsgård Institute for Fruit Tree Improvement**).
 Sverig. Pomol. Fören. Årsskr. 1944 : 45 : 58-59.

The work of the new institute was begun in 1942 and consists in the production and study of diploid and polyploid varieties of fruits among which tetraploid and triploid apples are specially mentioned. Experiments on the induction of polyploidy with colchicine have been made, not only with apples but to some extent also with hazel.

336. NILSSON-EHLE, H. 634.11:576.356.5:575(48.5)
Några nya rön rörande tetraploida äpplesorter och deras användning och
roll vid växtförädlingen hos fruktträd. (**Some new information
about tetraploid apple varieties and their use and role in the
breeding of fruit trees**).

Sverig. Pomol. Fören. Årsskr. 1944 : 45 : 229-37.

In spring 1944, large scale reciprocal hybridization of tetraploid and diploid apples was carried out and it is probable that some thousands of triploid seedlings have been obtained. In such large scale production it is important to use the best diploid varieties according to experienced growers' estimates.

The future aims are a dessert fruit of adequate size and the best quality with good keeping properties. Cox's Orange pollinated with tetraploid pollen yielded only 23 fruits from 296 flowers, and these crosses are therefore being continued to obtain sufficient material for selection. From the reciprocal cross, only one or two fruits were set from 14 flowers pollinated. A table shows the results obtained from pollinating other diploid varieties, e.g. Old Non Pareil, Jonathan and Boiken, with tetraploid pollen.

The process of selection for valuable new triploid varieties is explained with indications of possible future trends of work.

Two experiments on pollinating triploid varieties with tetraploids yielded five fruits in each case.

Detailed descriptions are given of 31 tetraploid seedlings obtained from the triploid Boskoop, Ribston, Canadian Reinette and Vrams Järn; and crossings between these various tetraploids are contemplated to increase the variety of tetraploid types available for further hybridization with diploids and for the production of more valuable triploids. The results of some tetraploid x tetraploid crosses at Ramlösa and the possible potential value of tetraploids in the production of large apples for domestic use are mentioned.

337. JOHANSSON, E. 634.11:576.356.5:576.312.35
Fortsatta undersökningar beträffande en 68-kromosomig äpplesort.
(**Further investigations regarding a 68-chromosome variety of
apple**).

Sverig. Pomol. Fören. Årsskr. 1944 : 45 : 135-40.

A tetraploid obtained from Belle de Boskoop x Filippa (cf. *Plant Breeding Abstracts*, Vol. XIV, Abst. 965) has been called T 16/36. Pollen from T 16/36 on Early McIntosh and on Laxton's Superb gave 89 and 35 seeds and ultimately 21 and 24 plants respectively. Cytological evidence so far strongly suggests that all these hybrids have 51 chromosomes. Hence it is now possible to produce for selection triploids derived from Belle de Boskoop. Selfing tests showed that the tetraploid gave a 10% fruit set with four seeds per fruit (cf. *Plant Breeding Abstracts*, Vol. XIV, Abst. 23 and Vol. XII, Abst. 713). Pollination of T 16/36 with three diploid varieties resulted in a fruit set of 12-27% with one to four probably functional seeds per fruit. It is of special interest that well developed seeds were obtained from T 16/36 x Cox's Orange; three seeds per fruit have been obtained from three fruits of this cross, so far. The reciprocal cross gave a satisfactory set of fruit but fully developed seeds were not obtained.

Crosses of T 16/36 with a tetraploid from Ehle's material at the Institute for Breeding Fruit Trees gave a percentage set of fruit of 22.4, and four of the fruits so far examined contained an average of 5.5 large, well developed seeds per fruit.

T 16/36 seems likely to surpass Belle de Boskoop in size.

The value of the tetraploid type from the breeding standpoint is indicated. It now seems possible that pentaploid types might be obtained from triploid x tetraploid crosses.

338. GEIGER-VIFIAN, A. 634.11:577.16:581.6(49.4)
Der Vitamin C-Gehalt in schweizerischen Apfelsorten. (**The vitamin
C content in Swiss apple varieties**).

Schweiz. landw. Mh. 1945 : No. 11 : 280-86.

Eighty apple varieties from the Wädenswil Research Station were tested for vitamin C content. The numerous factors affecting the vitamin C content and the fact that a high

content is not necessarily concomitant with high quality of apples show that the vitamin C content is not a criterion of quality. E. W.

339. RAMÍREZ CANTÚ, D. 634.2:582(72)
 Algunas plantas notables de Tepoztlán, Mor. (**Some notable plants of Tepoztlán, Mor.**)
 An. Inst. Biol. Univ. Méx. 1945 : 16 : 353-57.

A new species of *Prunus*, *P. Ochoteranae*, related to *P. laurifolia*, is described.

340. 634.22:581.162.5:575.12
 634.11:581.145.2
 JOHANSSON, E. 634.1:576.356.5:581.165.711
 Nyare undersökningar på fruktodlingens område. (**Recent investigations on fruit growing**).
 Sverig. Pomol. Fören. Årsskr. 1944 : 45 : 174-80.

The writer records findings from various sources regarding (1) seedlings as stocks for apples, pears and plums; (2) variation in fruit formation and ripening in *Prunus*, in relation to pollination, e.g. in the crosses, myrobalan x Blue Rock, myrobalan x *P. spinosa* and after self-pollination; and (3) fruit drop as a varietal character in apples. It seems possible that fruit fall may be related to the type of pedicel.

Apple and pear seedlings of triploid varieties have proved inferior as stocks to diploids. On the whole the seedlings from diploid pome fruit varieties proved suitable as stocks, though certain reservations must be made in view of differences observed in the behaviour in the seed bed and in the nursery.

341. GARDNER, V. R. 634.23:581.165.1:575.22
Studies in the nature of the clonal variety. III. Permanence of strain and other differences in the Montmorency cherry.
 Tech. Bull. Mich. Agric. Exp. Sta. 1943 : No. 186 : Pp. 20.

Intravarietal strain differences have been found to be one of the factors determining tree size in the Montmorency cherry.

342. BLAKE, M. A. 634.25:575(73)
Some present and future needs in peach breeding.
 Amer. Fruit Gr. 1946 : 67 : No. 2 : 11, 17.

A general discussion is given of objectives in peach breeding.

343. WANSCHER, J. H. 634.25:581.162.51
Partial pollen sterility as a somatic character of the peach.
 K. VetHøjsk. Aarsskr. 1941 : 91-105.

Investigations on the nature of partial pollen sterility in *Prunus persica* are reported. Pollen quality as indicated by the percentage of stainable grains was found to show marked variation in relation to the position of the flowers, suggesting that pollen quality depends upon the physiology of the flower and is thus a diplontic type of sterility. Genotypical differences in pollen quality were observed among eighteen varieties; rootstock was found to be without effect upon pollen production. The paper concludes with a general discussion of partial pollen sterility due to somatic influence.

344. BLAKE, M. A. 634.25-2.111-1.521.6:575(74.9)
Four new early varieties of peaches tested hardy.
 Virginia Fruit 1946 : 34 : 16-17.

The four new early ripening peach varieties developed in New Jersey, and designated N.J. 133, 134, 135 and 137, have shown promising cold resistance in tests at -8.5°F . (cf. *Plant Breeding Abstracts*, Vol. XVI, Absts 1895 and 1897).

345. POERCK, R. DE. 634.3:575(67.5)
 Note contributive à l'amélioration des agrumes au Congo belge. (**Note on the improvement of the citrus fruits of the Belgian Congo**).
 Publ. Inst. Nat. Agron. Congo Belge 1944 : Sér. Tech. No. 33 : Pp. 80.

A review is given of the work done at Vuazi towards developing satisfactory stocks and scions of citrus fruits for the Belgian Congo.

346. MERRILL, E. D. 634.37:582(59.7)
Records of Indo-Chinese plants, III.

J. Arnold Arbor. 1942 : 23 : 156-97.

This article includes descriptions of two new figs: *Ficus heterostyla* and *F. pubilimba*.

347. GODSON, J. and CHANNIN, M. 634.42:577.16(72.91)

La guayaba. Una nueva fuente de vitamina. (**The guava. A new source of vitamin C**).

Rev. Minist. Agric. Cuba 1946 : 29 : 93-95.

Notes are presented on the different varieties of guava. Fruits with salmon-coloured flesh usually contain less vitamin C than those with rose-coloured flesh.

348. 634.51:582

634.972.8:582

634.973:582

REHDER, A.

Notes on some cultivated trees and shrubs, II.

J. Arnold Arbor. 1945 : 26 : 472-81.

After describing some new forms of *Juglans nigra* L. and *Ulmus parvifolia* Jacq., a diagnosis is presented of the new species *Robinia leucantha*.

349. BURKETT, J. H. 634.52:575.12(76.4)

Pecan breeding technique.

Proc. 22nd Annu. Mtg, Tex. Pecan Grs' Ass. 1943 : 66-68.

An account of pecan improvement by hybridization is given. Bur-Del and Dave are varieties obtained from the cross Burkett x Delmas. Seedlings from crosses of Money-maker and Halbert with Burkett have also been produced.

350. REHDER, A. 634.52:582:001.4

***Carya alba* proposed as *nomen ambiguum*.**

J. Arnold Arbor. 1944 : 25 : 482-83.

In view of the diverse applications made of the name *C. alba* Nuttall, it is suggested that it should be declared a *nomen ambiguum*, and that in its place the two names *C. tomentosa* (Poir.) Nuttall and *C. ovata* (Mill.) K.Koch should be used respectively for the two species involved.

351. DODGE, F. N. 634.52.00.14(76.3)

Pecan varieties.

Proc. 23rd Annu. Mtg, Tex. Pecan Grs' Ass. 1944 : 7-16.

A report is given of the results of pecan variety trials, conducted since 1930 in Louisiana. Information on varietal susceptibility to disease is included.

352. SMITH, C. L. and ROMBERG, L. D. 634.52.00.14(76.4)

Relative behavior of four varieties of pecan during the development of an orchard at the U.S. Pecan Field Station, Brownwood, Texas.

Proc. 24th Annu. Mtg, Tex. Pecan Grs' Ass. 1945 : 10-15.

Information is given on the Burkett, Success, Jersey and Western Schley varieties of pecan.

353. URQUIJO, P. 634.53-2.411.4-1.521.6:575.127.2:581.165

Aspectos de la obtención de híbridos resistentes a la enfermedad del castaño. (**Aspects of the procurement of hybrids resistant to the chestnut disease**).

Bol. Pat. Veg. Ent. Agríc., Madr. 1944 : 13 : 447-62.

Details are given of hybrids of *Castanea sativa* x *C. crenata* which have been produced in order to obtain forms resistant to *Phytophthora cambivora* (Petri) Buis. Experiments have also been made to determine the most efficacious means of multiplying chestnut clones vegetatively so that any disease-resistant hybrids may be reproduced asexually.

354. MUSTARD, M. J. 634.65:577.16

The ascorbic acid content of some *Malpighia* fruits and jellies.

Science 1946 : 104 : 230-31.

Details are given on the ascorbic acid content of the berries of specimens of *M. puniceifolia* L., *M. coccigera* L. and an unidentified species of the same genus.

355. 634.7-1.524(73)

Nationwide fruits. Jamberries.

Amer. Fruit Gr. 1946 : 67 : No. 2 : p. 13.

Mention is made of a fruit called the *jamberry*, found growing wild in Ecuador. It is believed that the plant will be suitable as an annual fruit for garden cultivation in North America. The red, purple or yellow fruits are about two inches in diameter, and possess thin husks. It is reported that they can be used for a variety of purposes.

356. NILSSON, F. 634.72:576.356.5:581.04(48.5)

Tetraploida typer inom släktet *Ribes*. (Tetraploid types in the genus *Ribes*).

Sverig. Pomol. Fören. Årsskr. 1944 : 45 : 130-34.

A note on previous work on the subject is followed by an account of the author's experiments on the induction of tetraploidy by colchicine treatment of *R. Grossularia*, *R. petraeum*, *R. nigrum* and *R. nigrum* x *R. Grossularia*. The hybrid of *R. nigrum* x *R. Grossularia* made in 1939 proved intermediate between its parents. It flowered in 1943, but back-crosses failed. Colchicine treatment of cuttings in 1944 resulted in a plant which has morphological features characteristic of tetraploids and is thought to be an amphidiploid and probably fertile.

357. NILSSON, F. and JOHANSSON, E. 634.75:576.356.5:575.12

Nya typer och hybrider inom släktet *Fragaria*. (New types and hybrids within the genus *Fragaria*).

Sverig. Pomol. Fören. Årsskr. 1944 : 45 : 146-51.

American work on strawberries belonging to the polyploid series $2n = 14-56$ is mentioned. Only one species, the Asiatic *F. orientalis* was held to be a tetraploid with 28 chromosomes. In Sweden, intervarietal crosses were made by the authors in 1936 with *F. vesca*, also between varieties of *F. vesca* and *F. grandiflora*. Some of the most promising clones, which are now being tested at Alnarp, were obtained from crosses within *F. vesca*. Hybridization of varieties of *F. vesca* with and without runners also showed that runner formation is a dominant character.

A cross of a white fruited form of *F. vesca* and the garden strawberry Luna yielded about 50 F_1 plants, all but three of which had white fruits and may have arisen by apogamy. The remaining three had red fruits and might have been admixtures. In 1937, however, three plants were found differing from the sister plants, especially in leaf shape; these were probably true hybrids of *F. vesca* and *F. grandiflora*. Next year all three plants flowered profusely and the flowers appeared normal, but they formed practically no pollen and the little that there was failed to form pollen tubes in sugar solution. Further attempts in 1941 and 1943 at Alnarp to cross the pollen sterile varieties Southland, Frau Director Echtermeyer and Lucida Perfecta with *F. vesca* resulted either in no set or in a few seeds that did not germinate.

No true dwarf plants were obtained in these experiments on crosses of 14 and 56 chromosome species of *Fragaria*, though some may have died in the seed bed.

In 1938 the chromosome number of vegetative offspring from the three above mentioned hybrid plants was found to be $2n = 35$. Their flowers, though exposed to possible pollination by *F. vesca* and *F. grandiflora*, gave no set. Also later these plants proved highly sterile; no seed was obtained after controlled pollination, but in a couple of cases solitary seeds were observed after the flowers had been left under conditions where pollination was not restricted. This occurred, not in the original hybrid plants, but from runner plants from them.

Colchicine treatment of new plants formed on the runners, resulted in some plants with

about 70 chromosomes in some of the root cells; the plants bloomed next year but proved sterile like their maternal parents, so apparently doubling had not been universal nor permanent. Colchicine treatment of vegetatively produced progeny from this sterile group yielded plants, six of which had 35 chromosomes; more prolonged colchicine treatment of the progeny of these six plants or their sisters resulted in the discovery of two plants with 70 chromosomes, at least in some of the roots.

A hybrid with 35 chromosomes was also obtained from a cross of the variety Rügen of diploid *F. vesca* with the octoploid variety Königin Louise. The hybrid was intermediate as regards morphological features. Another cross of the pollen sterile Southland with Rügen again showed the ineffectiveness of crossing horticultural forms with the wild.

By treating runners from 56-chromosome plants with colchicine, two mixoploid plants were obtained with roots containing 56 and over 100 chromosomes. Morphologically the plants differed only slightly from the rest, and possibly 112-chromosome plants could be obtained in this way from *F. grandiflora*.

In 1940 experiments were begun to obtain tetraploid types of the runnerless variety Rügen. Colchicine treatment was used, and in 1942, 90 plants comprising tetraploids and triploids but no diploids were obtained. The pollen from these plants was examined in 1944; only one normal pollen grain was found in the triploid lot, whereas 60–70% of the large tetraploid pollen was normal. Diploid Rügen shows 90% of normal pollen.

In 1943, tetraploid Rügen plants, crossed with Königin Louise, gave two 42-chromosome plants which have not yet flowered. Since they have the same chromosome number as *F. elatior*, it should be possible by crossing them with it to produce new 42-chromosome types from three species. Many hybridization experiments with tetraploid and triploid plants of *F. vesca* were made in 1944.

Some seed of wild *F. vesca* from Rösmlå has also yielded five 28-chromosome plants out of 375 after colchicine treatment, so tetraploids of the *F. vesca* type with and without runners have now been obtained. H. Jensen of the Ramlösa nursery has also obtained two different tetraploid types of runner-forming *F. vesca* from Småland and these produce fruit of very good quality. All the various tetraploids showed reduced fertility.

358. KRONENBERG, H. G. 634.75-2.8-1.521.6(49.2)
 Virusziekten in aardbeien. (**Virus diseases in strawberries**).
 Tijdschr. PlZiekt. 1943 : 49 : 74-76.

Investigations, made in view of the continuous spread of virus diseases in strawberry beds in the Netherlands, showed the presence in that country of yellow-edge, crinkle, and witches broom. Transmission experiments by stolon grafting indicated that practically all the cultivated strawberry varieties carry the viruses, and only differ in the extent to which they react to infection. The varieties Mme Lefebvre and Oberschlesien were found to be highly tolerant, Mme Moutot, Laxton and Jucunda moderately tolerant, and Deutsch Evern and Royal Sovereign very susceptible. V. A.

359. LESLIE, W. R. 634.75.00.14(71.27)
Manitoba news letter.
 N. and S. Dak. Hort. 1946 : 19 : 133, 143.

Brief notes are given on the performance of 25 strawberry varieties, developed in Canada and the United States, under conditions at Morden, Manitoba.

360. GUADAGNIN, L. 634.771(81)
 A banancira. (**The banana**).
 Ceres, Brasil 1945 : 6 : 316-26.

Brief descriptions are given of the Brazilian varieties Roxa, Banana da Terra, Maranhão, Banana da Índia, S. Tomé, Prata, Maçã, Ouro and Nanica.

361. COLLINS, J. L. and 634.774:581.45:575.11
 KERNS, K. R.
Inheritance of three leaf types in the pineapple.
 J. Hered. 1946 : 37 : 123-28.

The inheritance of the following types of leaf margin in *Ananas comosus* was investigated:

(1) a spineless type named "piping", in which a narrow portion of the leaf edge is folded so that a strip of the lower surface appears on the upper leaf surface, (2) spiny tipped leaf, and (3) spiny leaf. The character of spiny tip was found to depend upon a single factor, designated *S*, and to be dominant to the spiny leaf. The "piping" margin is conditioned by a third gene, designated *P*, which is epistatic to *S* and *s*.

362. NICOLAS, G. 634.835-2.7-1.521.6
 Résistance des vignes américaines au phylloxéra et sensibilité de leurs cellules aux phytohormones. (**Resistance of American vines to phylloxera and sensitivity of their cells to phytohormones**).
 C.R. Acad. Agric. Fr. 1946 : 32 : 444-46.

It is believed that the formation of galls after attack by *Phylloxera* is due to cell division induced by indole- β -acetic acid injected into the plant by the *Phylloxera*. Vines resistant to *Phylloxera* do not react so markedly to indole- β -acetic acid, and the type of reaction may not be the same in different parts of the plant.

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363. FISCHER, F. 634.972.1:575.42(49.4)
 Nachzucht und Erziehung der Eiche im bernischen Bucheggberg. (**Regeneration and rearing of the oak in the Bernese Bucheggberg**).
 Mitt. Schweiz. Anst. Forst. Versuchs. 1944 : 23 : 375-470.

A note is included on the possibilities of selection when establishing oaks by artificial regeneration. This subject is discussed in the light of Landolt's researches.

364. SMITH, E. C. 634.972.3:576.312.35:575.127.2:576.16
 A study of cytology and speciation in the genus *Populus* L.
 J. Arnold Arbor. 1943 : 24 : 275-305.

An extensive investigation into the genus *Populus* has shown that the species *P. alba* L., *P. adenopoda* Maxim., *P. canescens* (Ait.) Sm., *P. grandidentata* Michx., *P. Sieboldii* Miq., *P. tremula* L., *P. tremuloides* Michx., *P. tomentosa* Carr., *P. lasiocarpa* Oliv., *P. acuminata* Rydb., *P. angustifolia* James, *P. candicans* Ait., *P. cathayana* Rehd., *P. koreana* Rehd., *P. laurifolia* Ledeb., *P. Maximowiczii* Henry, *P. Simonii* Carr., *P. Tacamahaca* Mill., *P. trichocarpa* Hook., *P. angulata* Ait., *P. deltoides* Marsh., *P. nigra* L. and their hybrids are all diploid with $2n = 38$ chromosomes. Triploid clones occur also in *P. alba*, *P. canescens* and *P. tremula*. The cytology of these species is described, also meiosis in the following hybrids: *P. Sargentii* x *P. acuminata*, *P. laurifolia* x *P. nigra*, *P. deltoides* x *P. nigra*, *P. Tacamahaca* x *P. deltoides*, *P. angulata* x *P. nigra*, *P. laurifolia* x (?) *P. tristis*, *P. nigra* x *P. laurifolia*, *P. nigra* x *P. trichocarpa* and several F_2 and more complex hybrids. Secondary chromosome associations were observed in several hybrids; no heteromorphic sex chromosomes could be demonstrated with certainty.

A discussion is given on the course of speciation within the genus. The ready interspecific hybridization, even between members of different sections of the genus is noteworthy. It is probable that the species only remain discrete through the operation of geographical and edaphic barriers. The species of the section *Leuce*, however, are physiologically isolated from the members of the *Tacamahaca* and *Aegeiros* sections, since they flower two to three weeks earlier. Genetic and chromosomal isolating mechanisms appear to have played but minor roles in bringing about interspecific isolation.

365. ROULEAU, E. 634.972.3:582:001.4
Populus balsamifera of Linnaeus not a *nomen ambiguum*.
 Rhodora 1946 : 48 : 103-10.

Reasons are given for believing that Linnaeus intended the name *P. balsamifera* to apply to the North American balsam poplar, now generally known as *P. Tacamahaca* Mill.

366. GRAM, K.,
 MUHLE LARSEN, C.,
 SYRACH LARSEN, C. and
 WESTERGAARD, M. 634.973:576.312.35:576.356.5:575.127.2
Contributions to the cytogenetics of forest trees. II. *Alnus*
studies.

K. VetHøjsk. Aarsskr. 1941 : 44-58.

Cytological investigations of the root tips of *Alnus* species gave the following results. *A. incana*, *A. glutinosa*, *A. hirsuta*, *A. tenuifolia*, *A. tenuifolia* var. *occidentalis*, *A. rubra* and *A. cordata* are reported as having the diploid chromosome number, $2n = 28$. Reputed trees of *A. subcordata*, *A. japonica* and *A. orientalis* were found to be triploid, with $2n = 42$, while *A. subcordata* showed the tetraploid chromosome number, $2n = 56$. Meiosis was studied in four diploids, six triploids and one tetraploid. Both the diploids and tetraploid exhibited a regular meiosis. In the triploid types meiosis was very irregular. The results are compared with those of other investigators, reference being made to the following species: *A. cordata*, *A. japonica*, *A. subcordata*, *A. glutinosa*, *A. orientalis* and *A. Spaethii*. The authors conclude that the genus *Alnus* consists of diploid and tetraploid species, the triploids representing interspecific hybrids.

A discussion is given of the possibilities of breeding *Alnus*. The triploid forms are considered to be especially valuable. Several interspecific hybrids have been already produced with a view to studying the possibilities of securing improved forms. Hybrids between diploids include *A. cordata* x *A. glutinosa*, *A. cordata* x *A. incana*, *A. cordata* x *A. rubra* and *A. cordata* x *A. tenuifolia* var. *occidentalis*. Crosses between diploid and tetraploid species include *A. cordata* x *A. subcordata*, *A. incana* x *A. subcordata* and *A. glutinosa* x *A. subcordata*. A few hybrid plants with $2n = 28$ have also been obtained by pollinating *A. cordata* with pollen from one of the spontaneous *A. subcordata* triploids, possibly derived from the cross *A. subcordata* x *A. glutinosa*. This cross was attempted since natural diploid hybrids occurring as the result of the cross *A. cordata* x a triploid *Alnus* exhibit valuable characteristics, notably quick growth and greater hardiness than the *A. cordata* parent. It is pointed out that the few desirable individuals secured from a cross of the $2n$ x $3n$ type can be reproduced by cuttings.

367. CHEVALIER, A. 634.973-2.111-1.521.6:575.247
 Un *Eucalyptus* résistant au froid venu probablement par mutation.
 (A *Eucalyptus* resistant to cold originating probably by mutation).
 Rev. Bot. Appl. 1946 : 26 : 232-34.

A new variety of *Eucalyptus* is described which arose as a sucker from the base of the trunk of a tree, the overground parts of which had been killed by frost. The new form is winter hardy and is believed to have originated by bud mutation. The species from which it arose is not certain; the new form, however, appears to be most closely related to *E. coccifera*. It is named *E. coccifera* var. *Favieri*.

368. DEUBER, C. G. 634.975:581.165
The vegetative propagation of eastern white pine* and other
five-needled pines.
 J. Arnold Arbor. 1942 : 23 : 198-213.

Considerable rooting ability was observed in pine cuttings between two and six years in age, but not in cuttings from older trees. Indolebutyric acid and α -naphthalene-acetic acid increased the rooting response.

369. THIMANN, K. V. and
 DELISLE, A. L. 634.975:581.165
Notes on the rooting of some conifers from cuttings.
 J. Arnold Arbor. 1942 : 23 : 103-09.

Notes are presented on the rooting capacity of species of *Abies*, *Tsuga*, *Picea*, *Sequoia*, *Podocarpus*, *Sciadopitys* and *Pinus*.

* *Pinus Strobus*.

370. SPURR, S. H. 634.975:581.48:581.9
Effect of seed weight and seed origin on the early development of eastern white pine.
 J. Arnold Arbor. 1944 : 25 : 467-80.

Seed weight of *Pinus Strobus* is positively correlated with seedling size until the third year, though the correlation diminishes as the plants age. A correlation was also observed between seedling size and the provenance of the seed, though in this case, the effect did not diminish with age.

371. MARTÍNEZ, M. 634.975:582(72)
 El *Pinus macrophylla* Engelm. y su variedad Blancoi. (*P. macrophylla* Engelm. and its variety *Blancoi*).
 An. Inst. Biol. Univ. Méx. 1944 : 15 : 341-48.

The specific status of *P. macrophylla* is affirmed against the views of Shaw who reduced it to a variety of *P. ponderosa*. A new variety *P. m.* var. *Blancoi* is described.

VEGETABLES 635

372. BARRONS, K. C. 635(77.4)
Vegetable varieties for commercial production in Michigan.
 Circ. Mich. Agric. Exp. Sta. 1944 : No. 191 : Pp. 35.

Notes are given on the varieties of nearly 40 different kinds of vegetables recommended for cultivation in Michigan.

373. SVENSSON, V. 635.13-2.7-1.521.6
 "Krusssjuka" å morötter. ("Curl disease" in carrots).
 Weibulls Ill. Årsb. 1945 : 40 : 40-41.

This malady is caused by adult and larval stages of *Trioza apicalis* sucking the leaves of the plants.

The possibility of varietal resistance owing to differences in the flavour of the leaves is mentioned.

374. ERMAKOV, A. I. 635.24:581.165.71:633.854.78:581.192
(Biochemical changes in grafted plants).
 Vestnik Socialističeskogo Rastenievodstva (Soviet Plant Industry Record) 1940 : No. 2 : 57-67.

This preliminary communication deals with a number of experiments in 1937 and 1938 on the chemical changes that can be brought about by various graft combinations of sunflower and Jerusalem artichoke, the two species or their hybrids being used as scion or stock. The effects of such grafts on the different chemical constituents of the seed, stems and leaves are recorded in detail.

It is thought possible that (1) as the stock influences the vital functions of the whole plant and the formation and maturation of the seed, changes may be transmitted to subsequent generations, and (2) the degree and character of the influence may depend on conditions favouring the development of characters either of the scion or of the stock.

375. CLARKE, A. E. and
 MCKAY, H. H. 635.25:576.356.5:575.127.2
A cytological study of some triploid onion plants.
 J. Hered. 1946 : 37 : 131-36.

Cytological investigations of the triploids obtained by back-crossing the amphidiploid *Allium Cepa* x *A. fistulosum* to *A. Cepa* and *A. fistulosum* are reported; in all the crosses the amphidiploid was used as the female parent. During meiosis eight bivalents and eight univalents were observed, and it is presumed that the chromosomes of the two sets derived from one species form bivalents, and the chromosomes of the third set originating from the other species separate as univalents. Observations on the behaviour of the satellite chromosomes confirmed this interpretation. The back-crosses could be readily distinguished according to the pairing behaviour of the bivalents. The back-cross of the amphidiploid to *A. Cepa* exhibited greater irregularity in meiosis than the back-cross to *A. fistulosum*.

376. BEEKOM, C. W. C. VAN 635.25-2.484-1.521.6:575.061.6(49.2)
 Vatbaarheidsverschillen voor koprot (*Botrytis* spp.) in het Nederlandsche
 uien assortiment. (**Differences in the susceptibility to neck rot**
(*Botrytis* spp.) of the onion varieties grown in the Netherlands).
 Tijdschr. PlZiekt. 1940 : 46 : 208-11.

Details are given of an experiment in 1939-40, in which seven named varieties of the Rijnsburg yellow onion and North Dutch straw-yellow onion types, and four named varieties of the Zeeuw brown onion type, were tested for their relative resistance to *Botrytis* neck rots during winter storage in straw covered heaps in the field. The results are stated to support the general view that the lighter coloured varieties are much more susceptible to the neck rots than the darker, as indicated by the fact that the straw-yellow variety Bola developed 5.5% and 3.5% rot as against an average of 1.95% and 1.3% rot in the four brown varieties, with a minimum of 0.9% in the van Loon selection. V. A.

377. HOFFMAN, I. C. 635.52:575.42(77.1)
Selecting leaf lettuce.

Proc. 29th Annu. Mtg Ohio Veg. and Potato Gr. Ass. 1944 : 152-56.

Selection of the Tipburn Resistant lettuce is described. All the strains of this variety were found to be richer in vitamin C content than Iceberg.

378. CÁRDENAS, M. 635.62:582(84)
 Notas sobre taxonomía de plantas económicas de Bolivia. Una
Cucurbita nueva. (**Notes on the taxonomy of economic plants of**
Bolivia. A new *Cucurbita*).
 Rev. Agric., Bolivia 1945 : 2 : No. 3 : 76-77.

A description is given of *C. urkupinana**, a new species from the province of Quillacollo, Bolivia.

379. KAZAKEVIČ, L. I. 635.624:575.42(47)
 635.615:575.42(47)
(Methods of growing the fodder pumpkin and water-melon.)
 Naučnyi Otčët Inst. Zernovogo Hozjaistva Jugo-Vostoka SSSR za
 1941-42 gg. (Sci. Rep. Inst. Grain Husbandry South-Eastern USSR for
 1941-42) 1944 : 86-95.

Two pumpkins, recommended for certain regions in the U.S.S.R., are Ispolinskaja and Serovolžskaja, the latter comprising a group of local forms.

Various centres where the cultivation of fodder melons is studied are mentioned, and the results of experiments on certain cultural operations are discussed.

Chemical analyses have revealed clear differences between different species and also between different varieties. This promises well for selection operations.

Both for seed production and fodder, an earlier maturing type of fodder melon is required, and efforts are being made by the New Crops Laboratory of the Saratov Institute to produce such varieties for the Volga basin. Selection and variety trials have resulted in the production of a new Saratov fodder melon giving 15.2% more fruits and a 5% heavier yield than the initial material.

380. KOOT, Y. VAN 635.63-2.484-1.521.6(49.2)
 Enkele onderzoeken betreffende de *Fusarium*-ziekte bij de komkom-
 mer. (**Some investigations on the *Fusarium* wilt of cucumbers**).
 Tijdschr. PlZiekt. 1943 : 49 : 52-73.

The results of the investigations described in detail in this paper are stated to have shown that, in the Netherlands, the *Fusarium* wilt of cucumbers is caused by the following species: *F. angustum*, *F. orthoceras* and its var. *longius*, and *F. Solani* var. *Martii*. White and yellow cucumber varieties were found to be as fully susceptible to wilt as the green varieties, with the only difference that the disease usually killed the former a few weeks later than the latter. V. A.

* *C. urkupinana* in the text.

381. WERNER, H. O. 635.64:575(78.2)

Two new tomato varieties.

Rep. Neb. Bd Agric. 1944 : 350-58.

The new varieties Sioux and Red Cloud are described (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1599).

382. FENNEL, J. L. 635.64:575.12(81)

El "tomate Turrialba". Una nueva variedad para tierras cálidas.

(**The Turrialba tomato. A new variety for the tropics.**)

Rev. Inst. Defensa Café, Costa Rica 1946 : 16 : 443-45.

This paper is a translation of an American original already reviewed in *Plant Breeding Abstracts*, Vol. XVI, Abst. 1439.

383. PORTER, J. W. and

ZSCHEILE, F. P.

635.64:577.16:575

Carotenes of *Lycopersicon* species and strains.

Arch. Biochem. 1946 : 10 : 537-45.

Selfed strains of *L. esculentum*, *L. hirsutum* and *L. pimpinellifolium*, and hybrids involving these species, were analysed for carotene content by spectroscopic examination of hexane extracts and chromatographic separation. The pedigrees of the selections containing the greatest amounts of the different carotene components are given.

384. DOOLITTLE, S. P.,

ORTE, W. S. and

BEECHER, F. S.

635.64-2.8-1.521.6:575.127.2

High resistance to common tobacco mosaic in certain lines of

***Lycopersicon hirsutum*.**

Phytopathology 1946 : 36 : p. 685. (Abst.).

Lines of *L. hirsutum* Humb. et Bonpl. have shown considerable resistance to common tobacco mosaic. Crosses between the *L. hirsutum* lines and commercial tomato varieties have failed to produce plants as highly resistant as the lines of *L. hirsutum*.

- 385.

635.65:575(47)

GODUNOVA, P. M.

635.65-1.531.12(47)

(Breeding, seed production and cultivation of legumes).

Nauchnyĭ Otčët Inst. Zernovogo Hozjaĭstva Jugo-Vostoka SSSR za

1941-42 gg. (Sci. Rep. Inst. Grain Husbandry South-Eastern USSR

for 1941-42) 1944 : 215-25.

The work carried out by the Institute for Cereal Production of the South-Eastern U.S.S.R. on legumes has comprised (1) the breeding of lentils, peas and gram; (2) seed production of lentils and gram; and (3) the study of methods of cultivation of lentils. Lentils and peas are desired with high yield, large seed, and with the lower pods attached relatively high on the stem. They should be non-lodging and non-shedding.

Details are given of the material and procedure used in breeding. In order to obtain non-lodging and non-shedding peas, intergeneric crosses have been made with gram, whose stem is strong and suited even to combine harvesting. Moreover, gram pods do not split even when left standing. Gram is also drought resistant and has a more vigorous root system than either lentils or peas. The combination of all these features in a single variety of peas or lentils would be of great practical interest.

In 1942 an observation plot was laid down with promising regional varieties, also local types from the Saratov district improved by mass selection. A number of promising varieties were discovered that surpassed the standards in yield. Special mention is made of the peas Štambovyĭ (Erect), and Nos 54, 62 and 63, which are characterized by an erect habit. They surpassed the standard Viktoria Strube in yield by 27-52%; and even when lodging occurred the upper portion of their stems remained erect and was thus saved from decay in bad weather and could be harvested by machine.

In gram trials, Dnepropetrovskii No. 6 showed the best yield and the shortest cooking time. In contrast to other investigators, the author found no ill effects from late harvesting on cooking time, the differences in which were varietal only.

386. MASTENBROEK, C. 635.652-2.3-1.521.6(49.2)
De vatbaarheid van boonenrassen voor de vetvlekkenziekte. (**Varietal susceptibility of beans to halo blight**).
Tijdschr. PlZiekt. 1943 : 49 : 135-62.

Details are given of experiments to test the relative susceptibility of 64 named bean (*Phaseolus vulgaris*) varieties to halo blight (*Phytophthora medicaginis* var. *phaseolicola*), in which a suspension of the bacterium was injected into the hypocotyl of young seedlings after their emergence above ground. The method used is stated to do away with the necessity of using sterilized soil for the experiments. The results, it is claimed, have shown general agreement with the varietal differences in the susceptibility of the beans in the field. Of the 64 varieties tested, 16 showed high resistance, and are considered to offer promising material for breeding; with the exception of the Dutch Blanca white bean, all the other 15 varieties are of American origin. V. A.

387. ZAUMEYER, W. J. and
HARTER, L. L. 635.652-2.452-1.521.6:575(73)
Pintos 5 and 14.
Sth. Seedsman 1946 : 9 : No. 8 : 14, 50, 54.

An account is given of two new pinto bean varieties, No. 5 and No. 14 Pinto, to be released in 1946. The varieties have been developed from a cross between the rust resistant, white-seeded Kentucky Wonder variety and the early maturing, rust susceptible Idaho Pinto bean. They combine rust resistance with tolerance to common mosaic and bacterial halo blight, and are primarily adapted to irrigated conditions.

388. DEAN, L. L. and
HUNGERFORD, C. W. 635.652-2.8:576.16:631.521.6(79.6)
A new bean mosaic in Idaho.
Phytopathology 1946 : 36 : 324-26.

It has been found that two strains of the common bean mosaic virus are present in Idaho. Breeding material showing resistance to both strains is available, and it includes several selections of Great Northern.

389. GRAHAM, G. H. 635.653-2.112-1.521.6(73)
The Hopi bean.
Rep. Neb. Bd Agric. 1942 : 426-28.

A brief account is given of the Hopi bean, a lima bean grown by the Hopi Indians. The variety is resistant to hot dry weather, and gives heavy yields. It is recommended for the home garden as a source of fresh and dry beans.

635.655:575(47)

New variety by Russians.

Soybean Digest 1946 : 6 : No. 12 : p. 27.

Brief mention is made of a new soya bean variety, Ussuriiski, which has been developed in the Far Eastern region of the U.S.S.R. The chief characteristics of the variety are a long stem and the grouping of the pods high on the stalk; loss of the pods in combine harvesting is thus prevented. About 50 acres are being sown with the new variety at the experimental station where it was developed. Seed has also been distributed to certain collective farms.

391. HENSON, P. R. 635.655:575(73)
The southern regional soybean variety program.
Soybean Digest 1946 : 6 : No. 11 : 37-39.

An account is given of the breeding and varietal testing work carried out on the soya bean as an oil and protein crop in 12 southern states.

392. CARR, R. B. 635.655:575(76.2)
Soybean varieties in the Yazoo-Mississippi Delta.
Soybean Digest 1946 : 6 : No. 9 : 12-13.

An account is given of the breeding and field testing of soya bean varieties in the Yazoo-Mississippi Delta.

393. HEIM, R. 635.655:581.142(44)
 Faculté germinative et conservation des graines de soja. (**Germination capacity and keeping capacity of soya bean seeds**).
 C.R. Acad. Agric. Fr. 1946 : 32 : 412-15.

Information is given on the germination capacity of French soya bean varieties, both soon after harvesting and two and a half years later.

394. HENSON, P. R. and
 CARR, R. S. 635.655.00.14(76.2)
Soybean varieties and dates of planting in the Yazoo-Mississippi Delta.
 Bull. Miss. Agric. Exp. Sta. 1946 : No. 428 : Pp. 12.

Tests of soya bean varieties and dates of planting, conducted during 1945 at five locations in the Yazoo-Mississippi Delta, are reported. In addition to information on yields and other agronomic characters, data are given on chemical composition.

395. ELIASSON, S. and 635.656:575.11
 JACOBSON, G. 635.656.00.14(48.5)
 Sortförsök med ärter och baljväxtblandsäd. Sammanställningar av resultaten av de av Jordbruksförsöksanstalten ledda försöken med ärter och baljväxtblandsäd under åren 1940 (1912)—1944. (**Variety trials with peas and mixed legumes. A summary of results of experiments during 1940 (1912)—1944 with peas and with mixed legumes, conducted by the Agricultural Research Institute**).
 Medd. Lantbrukshögskolan Jordbruksförsöksanstalten, Stockholm 1946 : No. 17 : Pp. 108.

A detailed account is given of the performance in Sweden of Swedish, English and other varieties of green and yellow culinary peas and fodder peas both unmixed and mixed with oats.

The report contains much useful information on older and recent varieties and their characteristics, and, though it does not include the results of trials conducted by the plant breeding institutes, it does include the relevant bibliography of such trials and also gives the formulae for the genotypic constitution of the various types of peas. A table is included showing the origins and relationship of different species and varieties of peas, together with the breeders' names.

396. 635.67:575(81)
Piracicaba sweet corn developed in Brazil.
 Agric. Amer. 1946 : 6 : p. 169.

A note is given on two new sweet corn varieties produced at the São Paulo State Agricultural College by crossing sweet corn varieties from Canada and the United States with Brazilian maize. The new varieties are known as Piracicaba Branco (White Piracicaba) and Piracicaba Laranja (Orange Piracicaba); they show several improvements in comparison with other Brazilian varieties.

BOOK REVIEWS

BATES, R. S.

061(73)

Scientific societies in the United States.

John Wiley and Sons, Inc., N.Y. 1945: \$3.50. Pp. vii + 246. tables.

This book on the history of the scientific societies of the United States does much to fill a gap in the history of the science of this country, for no extensive account of the history and scope of American scientific organizations has hitherto been available. With commendable thoroughness it traces the early growth of the scientific societies in the eighteenth century, during which period the rising scientific bodies of Europe were naturally influential upon the development of American science; the organization of science along more national lines in the period 1800-1865; and the increasing specialization in scientific organization from the close of the Civil War to the present day. The chapter dealing with the period 1919-1944 includes information on the growing part played in international science by American scientists. The final chapter describes various aspects of the organization of American scientific bodies, such as meetings, affiliation, libraries and publications. An excellent bibliography is included. As a source of information the book is invaluable, but as a history it is less successful, since the connexion between scientific organization and the history of the United States, though to some extent realized, is reduced to a minimum. Only occasionally is a glimpse given of the social and economic events which are not only the background of scientific development but also its fundamental stimulus. Thus the book makes somewhat tedious reading of divorced facts.

KENDALL, M. G.

519

The advanced theory of statistics.

Charles Griffin and Co., Ltd., London 1946: 2nd Ed. Pp. vii + 521.

30 illus. 52 tables.

This volume completes the first comprehensive attempt which has been made to present the theory of statistics as a formal mathematical study, and the author is to be commended for the immense pains he has taken to gather so much material from a multiplicity of sources. The volume of work which has been done can be seen from the most useful bibliography of titles, extending over 62 closely printed pages, with which the book concludes. Even this is only a selection. The main sections dealt with in this volume are (1) the logic of statistical inference, comprising chapters on estimation, confidence intervals and fiducial inference, (2) tests of significance, including the general theory of such tests, (3) regression and multivariate analysis, (4) analysis of variance and the design of sampling enquiries, and (5) the study of time-series.

The practical statistical worker who is not a professional mathematician will find the early part hard reading. For the rest he will be concerned to supplement his knowledge of statistical tests gleaned from the first volume by the more advanced methods appropriate for two and more variables, and in particular regression analysis. In this connection the many worked examples will be of very great assistance to him. The biological worker will turn with interest to the sections on analysis of variance and experimental designs. These have been expounded many times, generally from the non-mathematical point of view, but it is important to keep in mind the assumptions behind the common tests, and it is valuable, therefore, to have a mathematical exposition. This proceeds logically from the special cases of one, two and three-way classifications to the general n -way classification, followed by examples illustrating the use of the z test and the transformation of variates. The principle of randomization then leads up to the practical designs found useful, for example, in agricultural field experimentation. In a following chapter, unequal sub-class numbers are dealt with, followed by the missing plot technique and then by a discussion of the relation between these methods and regression analysis; finally the theory of the analysis of covariance is expounded. The design of experiments is considered somewhat briefly in a separate chapter, which also hints at the various complexities behind sampling enquiries generally.

J. W.

KLAAUW, C. J. VAN DER (Editor)

57:016

Bibliographia Biotheoretica 1930-1934.

Vol. II. 14 guilders, Pp. 310; 1935-1939. Vol. III, 21 guilders; Pp. 371; 1944. Vol. IV, Pt 1, 5 guilders, Pp. 82.

Published by E. J. Brill, Leiden.

Volumes II, III and IV part I have now been received of the valuable *Bibliographia Biotheoretica* edited by Dr van der Klaauw in association with other Dutch biologists. The field covered by each of these volumes is as follows. Under the heading *Biologia universa* are classified titles of books and papers on the scope and nature of biology, the philosophy of biology and various controversial theoretical studies connected therewith, also articles dealing with the application of statistics to biological questions. The next section *Systematica* deals with general treatises on the principles of taxonomy, and is followed by the section *Morphologia* covering theoretical discussions dealing with morphology, homology and the relationship between form and function. A rather heterogeneous series of contributions are grouped under *Physiologia*, including articles on physiology as ordinarily understood, growth, biochemistry, the nature of sex, parthenogenesis, heterosis and physiological genetics. More detailed accounts of morphogenetic determination, often termed causal morphology, are relegated to a section called *Physiologia Formarum*.

Plant breeders and geneticists will be chiefly interested in the two sections on *Cytologia et Histologia* and *Genetica*. The field covered by these two necessarily overlaps; in the case of the latter, three subdivisions are adopted, the first on the nature of variation, including several statistical papers, the second on theories of inheritance, and the third on theories of evolution.

The section on *Oecologia* covers both plant and animal ecology and also several papers on adaptation. It overlaps with the next section on *Biogeographica*, which, however, emphasizes the broader problems of the distribution of organisms.

Both human psychology and animal behaviour studies are treated under *Psychologia et Ethologia*. This section is followed by another on *Phylogenetica et Biohistoria* which is differentiated from the section on evolution mentioned above by its more theoretical and controversial interest.

A large section on *Pathologia et Curatio* is on medical theory, and is followed by *Philosophia Vitae Organicae* which is philosophical, and the whole is completed by a section on *Historia Biologiae Theoreticae* listing papers on the history of biology.

The volumes under review cover between them publications appearing between 1930 and 1944; the lists appear to be very comprehensive and should prove of the utmost value to any research worker wishing to acquaint himself with recent developments in theoretical biology. Naturally the bibliographies cannot aspire to being complete, so vast is the field covered. There is however a definite dearth of information on Russian biological theories, particularly the controversial genetical theories associated with the name of Lysenko.

It is possible also that the arrangement of the references could have been improved. At the moment, the fields covered by the various sections overlap so much that the latter contribute but little towards simplifying the task of the consultant. There is no doubt, however, of the very great usefulness of these volumes, and they may be recommended to all research workers in theoretical biology.

CARLES, J.

575.1

Problèmes d'hérédité. (Problems of heredity).

Beauchesne et Ses Fils, Paris 1944 (1945): Pp. 258. 37 figs.

Dr Carles has written an interesting survey of the present state of genetical theory. His account does not purport to be a text-book, but to describe for the benefit of the educated non-scientific public the salient features of modern genetics.

A brief historical introduction deals with the theories of heredity put forward by Aristotle and the scholastics, Lucretius, the preformationists, the epigeneticists, Darwin, Weismann, Naudin, Galton and finally Mendel and the writers of the modern period. The laws of Mendel are next described, and then the chromosome theory of inheritance, including an

excursus on Goldschmidt's theory, which the author rightly regards as far closer to neo-Darwinism than its verbal statements seem to imply.

After this general survey, a more detailed consideration is given to human heredity, blood groups, racial theories, eugenics, natural selection, in which the author deprecates the exaggerated emphasis often laid upon it, and the mechanism of evolution.

The author is obviously well abreast of current genetic theories, and his exposition is consistently fair. Many eugenists will not find palatable the author's careful distinction between the biological and moral values involved in eugenic theories. In view, however, of the failure of the several recent attempts to derive moral values from biological premises, the author's distinction is fully justified. Many readers will not be prepared to accept the moral principles set out by Dr Carles, but none can deny the serious consequences that must necessarily follow the application of genetical theories to human affairs, if autonomous ethical principles are totally excluded.

ZIRKLE, C.

575.3:9

575:9

The early history of the idea of the inheritance of acquired characters and of pangenesis.

Trans. Amer. Philos. Soc. 1946: \$1.25. (N.S.) 35: Pt II. 91-151.

Lack of historical perspective has encouraged the illusion that the theory of the inheritance of acquired characters was developed chiefly by Lamarck. A similar mistake has associated the essentials of the theory of pangenesis with Darwin who coined this term for it.

Professor Zirkle, whose many contributions to the history of botany have done so much to rectify current misconceptions, has here presented a brief survey of the history of these two theories and he shows fully how ancient both are. He does indeed go further, and establishes that it is only exceptionally that dissent from them has been expressed.

Taking the theory of inheritance of acquired characters first, Professor Zirkle, after emphasizing that this theory is accepted almost universally by the scientifically uneducated, goes on to quote examples of its currency from Greek mythology, the Old Testament, Aristotle, Pliny, Galen, the medieval scholastic philosophers and numerous writers from the Renaissance onwards. Only very rarely was the theory opposed. Lucretius felt that its admission would render inexplicable the existence of specific differences, while Bonnet thought it disproved by experiments on the inheritance of mutilations. Lord Kames, the eighteenth century anthropologist, and Kant the philosopher, also rejected the theory, the latter on grounds somewhat similar to those urged by Lucretius. After the publication of Lamarck's speculations, the theory was still generally accepted, though it had lost something of its former respectability through Lamarck's rather grotesque treatment of it. Yet opposition to it still showed itself sporadically, the pre-Darwinian authors James Prichard and William Lawrence being examples in point.

With regard to the theory of pangenesis, the case is more complicated, since Professor Zirkle uses this term in a very wide sense, so as to cover the widely divergent theories of generation proceeding from Hippocrates and Aristotle respectively, notions referred to by the author as the Darwinian and Buffonian theories.

Hippocrates was one of the first to propound the theory that, in animal generation, the semen is formed by small particles detaching themselves from every part of the body, passing thence to the reproductive organs. The embryo was believed to develop through the ability of the detached particles to arrange themselves and develop along the morphogenetic track characterizing its parents. This rather crude theory was probably held also by Anaxagoras and appealed specially to the materialists Democritus, Epicurus and Lucretius. In later times, however, the Hippocratean theory became eclipsed by Aristotelean theories, and it hardly reappears until the time of Paracelsus, who presents the older theory in a rather modified form. From the sixteenth century onwards, it received a considerable degree of support, particularly from medical writers developing the ideas of Hippocrates and Galen. A variant of the theory attributed the origin of the semen, not so much to the individual parts of the parent, but to the blood as a whole. Amongst the most prominent later supporters of the Hippocratean theory were Jacobus Sylvius, Julius Scaliger, Donatus, Alexander Ross, Le Grand, Malpighi and Ray. The latter, however, followed the Cambridge Platonist Cudworth in invoking the *Plastick Nature* to

order the component parts of the semen, and thus approaches in some ways the outlook of the Aristoteleans. A curious mnemonic theory of pangenesis was devised still later by Diderot to eliminate an obvious gap in the Hippocratean theory, the explanation of how the seminal elements arranged themselves in due order. He suggested that they could re-arrange themselves by remembering their original position in the parent.

Professor Zirkle's treatment of the Aristotelean view of generation seems a little less perspicuous than the rest of his account, partly because insufficient distinction is drawn between the two distinct theories involved. There is firstly the strictly biological theory that the semen is derived, not from the various parts of the body but from excess nutriment; secondly, there is Aristotle's purely metaphysical concept of *ἐντελέχεια* (*anima*), the primary form of the organism. All Aristotelian writers accept the latter notion, but many, especially among the later writers, do not accept the former theory. These later writers, including Sir Kenelm Digby and his followers, who regarded the semen as modified by the whole body though not consisting of a mere aggregation of detached particles, are classed by Professor Zirkle as upholders of the Darwinian theory, even although their fundamental theory of generation is very different from that of the more materialistic followers of Hippocrates.

The earlier Aristoteleans accepted both of Aristotle's propositions, and it is interesting to read the very detailed considerations given to the various theories of the origin of semen by such writers as St Thomas Aquinas, St Albert the Great and Roger Bacon. As Professor Zirkle remarks, the article by St Thomas Aquinas *Utrum semen decidatur ex eo quod generatur ex alimento* in the Commentary on the Sentences is one of the most detailed considerations of the theory of pangenesis ever written, anticipating in considerable detail the theory of Buffon in the eighteenth century. There is no doubt, as Professor Zirkle himself indicates, that further research would bring to light many other dissertations on this subject from the schoolmen of the later Middle Ages.

It is with Buffon that the Aristotelean theory of the origin of semen receives its most developed expression, though by this time it had discarded the Aristotelean metaphysical background. Buffon's theory, which was developed even further by John Needham, remained current together with Darwin's version of the Hippocratean theory, until both were overturned by the re-discovery of Mendel's work. In the eighteenth century, of course, all the pangenetic theories of generation had to contend with the intricate speculations of Bonnet and the other preformationists, an extremely interesting phase in the development of biological thought which however falls outside the scope of Professor Zirkle's review.

The amount of historical research that has gone into the compilation of Professor Zirkle's account will be obvious to any student of the history of biology. It is only to be hoped that many more monographic reviews of comparable value will be forthcoming in the near future, for then there will be some chance of a future author being able to write a really reliable and comprehensive treatise on the history of biology, a desideratum still awaiting fulfilment.

PARAMONOV, A. A.

575.4

(**A course of Darwinism**).

Sovetskaja Nauka, Moscow 1945: 27 roubles 50 copecks. Pp. 432.

176 figs.

This is a text-book for advanced and post-graduate students in the field of general biology and genetics. The course comprises four sections: the introduction, dealing with the significance and problems of Darwinism as a special branch of biology; the general principles of Darwinism; a special course of Darwinism; and the conclusion. The scope of the treatise is as follows. There are three chapters in section I: (1) a discussion of the concept and problems of Darwinism; (2) a brief historical outline of the idea of evolution of the organic world in antiquity, the Middle Ages and modern times; and (3) a consideration of the life and work of Lamarck. Section II contains three chapters: (4) an account of the general background and prerequisites that preceded and assisted the development of Darwinism as a biological and philosophical theory; (5) an account of Charles Darwin and his work; and (6) an analysis of Darwin's theory. Section III includes eight chapters on (7) organic evolution as a natural phenomenon; (8) variability as a factor in evolution;

(9) heredity; (10) natural selection; (11) the main paths of development and the general laws governing the process of evolution; (12) the origin of man and the probable course of his evolution; (13) control of the evolutionary process, including a review of the work of Timirjazev, Lysenko, Mičurin, Ivanov and other Russian scientists; and (14) a criticism of what are called anti-Darwinian theories. The conclusion is devoted to Russian contributions to the development of Darwinian theory in both the pre-revolutionary and post-revolutionary periods. At the end of the book there is a list of selected references for each chapter.

This treatise represents a new and original Russian contribution to the problem of evolution. Darwinism is defined as a branch of science investigating the process of organic evolution. Much attention is devoted in the opening chapters to the general concept of Darwinism in its biological and philosophical aspects. The student, thus prepared, can make his way gradually through the detailed exposition of the theoretical and practical implications of evolution. The book is an interesting attempt to integrate available knowledge and relate it to every branch of biology.

SCHMALHAUSEN, I. I.

576.12

(The problems of Darwinism).

Sovetskaja Nauka, Moscow 1946: 30 roubles. Pp. 528. 200 figs.

This volume is a text-book for advanced students of biology. The book is planned on the following lines. In section I an outline is given of the origin of the organic world; this section also includes a history of the theory of evolution, an account of Darwin's theory, an appraisal of it, and a description of the controversy that eventually led to the general recognition of Darwin's views. The elementary principles of the process of evolution are dealt with in section II. The factors responsible for the progress of evolution, struggle for existence and natural selection, are discussed in section III. The problem of multiformity of the organic world, including the question of species formation and divergence of characters, forms the subject of section IV. The problem of correlation, that is, the questions pertaining to the importance of interdependence in the changeability of characters and organs in the course of organic evolution, is considered in section V. The problem of interrelation between individual ontogenetic development and historical phylogenetic development of living organisms is analysed in section VI; this question is considered with reference to the biogenetic law, Behr's laws and the theory of phylembryogenesis elaborated by Severcov. In section VII, data are furnished on the external and internal factors affecting the development of animal organisms; in particular, much attention is paid to the laws expressing the inter-relationship between the changeability of external factors and the structure and life processes of living organisms on the one hand, and that between form and function on the other. Section VIII is devoted to considering the main avenues along which the process of evolution progresses as a result of the impetus imparted by the factors determining the course of evolution itself. The general laws governing the trend of specific, concrete evolution of organic forms, mainly based on palaeontological data, are considered in section IX. The illustrative examples are mostly taken from the realm of zoology. The botanical material is used only as and when required for a deeper understanding of a specific problem. The relevant classical data and the history of Darwinism do not encumber the text but are to be found in a special section of the book. Of particular interest is section IX dealing with the process of evolution as a dialectical mode of development. There are two pithy summaries dealing with the problem of organic multiformity and that of correlation in the development of the organic world respectively. The volume is a fair example of the modern trend of biological thought in the U.S.S.R. It is certainly a highly interesting contribution to the present-day theory of evolution.

H. F.

NELSON, A.

58:63

Principles of agricultural botany.

Thomas Nelson and Sons, Ltd., London 1946: 35s. Pp. xvii + 556.

182 figs. 128 half-tone pls. 17 coloured pls.

It seems to have been assumed for many years now that any sort of text-book is good enough for students reading agricultural botany. Consequently, there have been no

texts that could be recommended without grave reserve to anybody wishing to make a first contact with this subject.

Recently, however, Dr Nelson has prepared a completely new text-book, which is so far superior to all pre-existing books on this subject, that it is likely to become the standard introduction to agricultural botany. Its merit lies chiefly in the extraordinarily fine series of diagrams which embellish the book; there are 17 colour plates, 128 black and white plates and 182 text figures. It may be said with little exaggeration that these alone convey more worthwhile information to a reader than the complete text of several previous accounts. Only one criticism might be made in this connexion, and that is in respect of the omission in quite a number of cases of the names of the plants figured.

The text is written simply and clearly. It does not reach the same standard as the illustrations, since inexactitude and over-generalization are rather too prevalent. Since, however, the account is intended specifically for agricultural students who are not concerned with the finer points of botanical theory, this criticism is perhaps uncalled for. The scope of the book leaves nothing to be desired. Eight introductory chapters are devoted to the morphology and anatomy of plants, thirteen to plant physiology and its practical consequences in agricultural practice, four to weeds and plant diseases, and two final chapters to genetics, plant breeding, taxonomy and evolution. An unusual and valuable feature of the whole book is provided by the carefully selected bibliographies at the end of each chapter, and the guide to English abstract journals in the introduction. Dr Nelson's book fully deserves to pass into general use in all the agricultural institutes of Great Britain and other temperate countries.

THORNDIKE, L. and
BENJAMIN, F. S. (JUN.)

58:9

The herbal of Rufinus.

University of Chicago Press, Chicago, Illinois 1946: \$5. Pp. xliii + 476.

One of the most successful conspiracies ever perpetrated was that of the sixteenth century against the Middle Ages. So effectively did the protagonists of the New Learning belittle the achievements of their predecessors, that from that day to now, the majority of treatises covering the history of European thought have begun with the Greeks, passed briefly to the Romans and then leapt the intervening centuries to continue their story from the sixteenth century onwards.

As for the reasons for this very significant behaviour, it is easy to show how considerations extraneous to natural science have exerted a most profound influence on the general outlook of scientists. Theological considerations in the seventeenth and succeeding centuries, philosophical considerations in the eighteenth and nineteenth centuries and political considerations in the present century have all moulded the attitudes of scientists profoundly, and their several effects are easily discerned by historical analysis. Also, the ignorance of so many scientists where historical method is concerned, and their frequent contempt for it, have resulted in a state of affairs where any sort of inaccuracy in the history of science is held excused and unimportant.

In point of fact, the whole idea of the sixteenth century as a dividing line between an earlier obscurantist era and a later enlightened age is hopelessly inaccurate. The Renaissance properly speaking was a literary moment, whose guiding principles had been aired intermittently throughout the whole medieval period. Its exponents tended to exalt literary style at the expense of content, and consequently despised the barbarous language of philosophers, and scientists alike—echoes of their scorn assail scientific ears even today. The Reformation on the other hand was largely independent of the humanist movement and antipathetic to it. Its influence on the development of science was negative on the whole, and in as far as internecine theological controversies drove away practically everything else from the universities of England and Germany during the early seventeenth century, its effect was definitely retrogressive. The scientific movement itself, however, had already been long in existence when the sixteenth century opened; the great scientists of the century were not humanists, and the fact that Italy was and remained the scientific centre of the world till the middle of the following century is largely owing to the absence of religious strife from its universities. The development of English science and the

foundation of the Royal Society had to await the exhaustion of sectarian controversy at the time of the Restoration.

Scientific research in fact had a long and interesting history in the Middle Ages, and its development was very largely independent of the two sixteenth century movements with which the historians of science have associated it. The evidence for its status in the Middle Ages is however familiar to very few, though since the publication of Professor Thorndike's monumental *History of Magic and Experimental Science*, much of this evidence has been generally available. Indeed, it is to Professor Thorndike, more than any other living author, that we owe the unveiling of the history of medieval science, and the volume here reviewed is but another of his many signal contributions to this subject.

Rufinus was a thirteenth century botanist, who studied at the universities of Naples and Bologna. He wrote a herbal, here edited by Professor Thorndike, which gives evidence both of his first-hand acquaintance of plants and their uses, and also of his familiarity with the literature. His herbal is a collation of the writings of Dioscorides, the author of *Circa instans*, Macer and several other writers, to which he appends an account of his own investigations. It is particularly interesting to discover his indebtedness to the medical and botanical writers of the now extinct university of Salerno, an academy whose liberality of outlook was such that Jews and Muslims were permitted to teach, a permission extended by no university in England before the nineteenth century.

It might be asked what importance Rufinus' manuscript has now for the history of botany, since it is quoted by only one later writer, Benedetto Rinio of Venice. The answer is that it reveals the quite extensive and competent knowledge of botanists of that time, a knowledge obviously widely diffused but seldom written up. Further, there are a number of plants described by Rufinus which are omitted or but seldom mentioned by the "German fathers of Botany" of the sixteenth century. Most of all, it adds one further iota of evidence to show that botany is not a stripling science of but four hundred years' growth, but is a discipline whose antecedents are as venerable as any other branch of learning. Professor Thorndike will earn the gratitude of all history of botany by his scholarly edition of Rufinus' work. It is only necessary to add that the printing and binding of his edition follow the highest traditions of American book production.

WHYTE, R. O.

581.1

Crop production and environment.

Faber and Faber Ltd., London 1946: 25s. Pp. 372: 53 figs. 32 pls. 36 tables.

Study of the physiological developmental processes of the plant in relation to environmental factors is receiving more and more attention; such research has very considerable economic significance, with fundamental bearing upon agronomic technique, crop introduction, and the breeding of better adapted varieties. Research along these lines is producing scientific re-orientations in several directions, particularly in breeding and genetics. In compiling a comprehensive review of the literature, Dr Whyte has performed an invaluable task and feat of analysis of an exceptionally wide and intricate subject.

Information on growth and development, the effect of temperature and light upon the life of the plant, the relationship between darkness and development, phasic development, the location of response to environmental factors, hormones, the physiological aspects of resistance to drought and winter conditions, and related topics are surveyed with mastery. The book is well-balanced, and the scientific and practical aspects receive similar detailed attention. The final chapters deal with crop production in relation to geographical problems, the inheritance of environmental requirements, vernalization and other treatments based upon the knowledge of developmental behaviour, and the developmental physiology of individual crops. The chapters on the inheritance of physiological reactions indicates the importance of the many-sided study of developmental physiology to the understanding of present-day conflicts between Mendelian geneticists and the "developmental" geneticists of the U.S.S.R. A large number of illustrations from British, American, Russian and other papers are included. This important book should do much to direct future study along the most profitable lines of experimental analysis.

ARBER, A.

581.4

Goethe's botany.

Chronica Botanica 1986: 10: 67-124. Published by Chronica Botanica Co., Waltham, Mass.; Wm. Dawson and Son, Ltd., London. (price \$2.00).

Although a century and half has passed since Goethe's classical *Versuch die Metamorphose der Pflanzen zu erklären* was first published at Gotha, there is still little agreement as to the value of Goethe's speculations in the realm of plant morphology. Yet Goethe's importance in the history of botany admits of no dispute, and the present volume by one of our greatest living morphologists will be welcomed by all botanists, whatever estimate they have formed of Goethe's ideas.

Dr Arber has issued a new translation of the *Versuch*, the text and translation of the fragment now known as *Die Natur*, which expresses Goethe's earlier views on the philosophy of Nature although possibly not written by himself, and has prefaced these by a valuable introduction on the development of Goethe's botanical theories and their importance in the history of plant morphology.

This introduction might indeed be read with profit by any student embarking on the study of morphology. The authoress has written a most luminous account of the rationale of morphological "types" and has elucidated the relationship between Goethe's *Ur*-categories and De Cardolle's notion of basic symmetry, and that between the notion of morphological type and the concept which Dr Arber herself has done so much to develop of morphological parallelism.

Goethe's theory has of course always been closely associated with certain philosophical tendencies, and in this connexion, Dr Arber has some provoking remarks to offer on the nature of scientific explanation, whether of the so-called cause and effect type, or the difficult explicative notion which Goethe called *Darstellung*. It is rather difficult to agree with Dr Arber's rather severe delimitation of the boundaries of science when the more abstruse realms of Goethe's thought are considered. Botany after all embraces all that relates to plants, however abstract such considerations become. Also, those botanists who look forward to the day when all the traditional categories of plant morphology will be swept away by the introduction of the class categories of contemporary symbolic logic, will feel a trifle impatient at the careful comparisons made by the authoress between what they would regard as notions inevitably vitiated by subjective *Anschauung*. Nevertheless, Dr Arber undoubtedly presents traditional morphology under its most attractive guise, and her appreciation of Goethe will be received by respect even by the most obdurate critic of all that Goethe represents in the field of plant morphology.

6

Emulsion technology, theoretical and applied.

Chemical Publishing Co., Inc., N.Y. 1946: 2nd Edition. \$6.50. Pp. xiii + 360. figs. tables.

Emulsions play an important, if unspectacular, part in modern technology and have inevitably received attention from the research organizations of many widely different industries. To bring together the results obtained and to relate them to fundamental theory is to make a valuable contribution both to applied science and to theoretical colloid science.

This second edition of *Emulsion Technology* consists of papers given at a symposium held by the British Section of the International Society of Leather Trades Chemists an unspecified number of years ago, with certain American revisions and additions. The sixteen contributions vary widely in quality and interest. One of the most interesting from the biological point of view is that on the use of highly dispersed emulsions in the treatment of toxæmic conditions. This technique appears to offer a valuable means of combating diseases such as pneumonia, but the fact that the latest reference on the subject is dated 1934 suggests either that the method has not been developed to the extent that it should be or that revision has not extended to this section. A chapter on the preparation and application of emulsions for use in agricultural spraying contains information useful to those concerned with the control of pests. The last section gives a very readable account of the theory of emulsions and emulsifying agents.

Many of the illustrations are obscure and serve to confuse rather than assist the reader. It is necessary to devote some time to the study of the format of the table of emulsifying agents given at the end of the book before its real usefulness can be appreciated. *Emulsion Technology* contains much information of value to those concerned with the preparation and application of emulsions. It is doubtful if those whose interest in emulsions is academic will be prepared to face the arid stretches of technical matter for the sake of the two or three stimulating and generally interesting articles that it contains. . G. E. F.

SKOVGAARD, K. and

PEDERSEN, A.

63(48.9)

Survey of Danish agriculture with a supplement on Danish horticulture.

National Danish F.A.O. Committee, Denmark 1946 : Pp. 169. 42 tables. photos.

This survey of Danish agriculture was prepared for the National Danish F.A.O. Committee. The publication gives a historical account of the social, economic and scientific aspects of Danish agriculture. Denmark is a country distinguished by a long tradition of democratic and co-operative activity, and before the war, Denmark was for many years an instructive example, particularly to other European countries, in the relatively high efficiency of its agriculture and the well-being of its agricultural population. In the post-war world, in a period of planning for national and international prosperity, it is obvious that an understanding of the developments and methods of Danish agriculture, and of the acute agricultural problems of Denmark at the present time, is essential. The appearance of this objective survey, giving information up to the year 1945, is timely. Denmark can play an important part in the solution of international food problems, but today insufficiency of imports of raw materials for agriculture, high cost of production and decreasing export prices hamper production. The Danish farmer is in the paradoxical situation of producing foodstuffs which most other countries of the world lack, at prices which hardly yield any returns. As in the case of every country, the particular problems of Danish agriculture are international.

Without a close relationship between research and practical farming, Danish agriculture could not have reached its high level; as a particular example of the close contact existing between research and the farmer the survey instances the plant breeding work. A supplement is included on horticulture. This is especially interesting in view of the growing importance of horticulture in Denmark.

BOERGER, A.

63:1

Agronomía. Consejos metodológicos. (Agronomy. Counsels on method).

Casa A. Barreiro y Ramos, S.A. Montevideo, 1946: Pp. xix + 538. 37 figs. 4 tables.

One of the several anomalies in the history of science is provided by the fact that scientific investigators are very seldom exponents of the theory of scientific method and vice versa. It has become a commonplace in histories of science that Francis Bacon was one of the most potent instruments in liberating men from the shackles of scholastic philosophy and guiding them towards empirical research. Yet, if the writings of scientists of the seventeenth and eighteenth centuries are examined, the influence of Bacon is found to be extremely slight, certainly far less potent than that of the various peripatetic schools of philosophy or the various Platonic schools that developed in Florence, Naples, Louvain, Prague, Cambridge and elsewhere. Bacon's principal influence was on the development of empirical philosophy, especially on the French *philosophes* of the eighteenth century, and not on the scientific investigators of his own or later times.

Dr Boerger, however, constitutes a striking exception to this generalization, for not only has he made important contributions to practical plant breeding and scientific agriculture, but he is also one of the most erudite exponents of the theory of scientific method, not only in South America but in the world at large. His *Consejos Metodológicos* are therefore of unique interest to any student either of scientific agriculture or of scientific method. They

may also be regarded as an autobiographical testament of the author, for they vouchsafe the reader an extraordinarily vivid insight into his general outlook.

Dr Boerger emphasizes the importance for himself of two writers in particular, Ramón y Cajal, the well-known Spanish histologist and author of *Reglas y Consejos* for scientific research, and Thaer, the late eighteenth century German agriculturalist, whom the author regards as the virtual founder of scientific agriculture, or agronomy. Of particular value is Dr Boerger's timely vindication of the status of applied science, which he shows to constitute one of the bridges between pure science and the humanities.

The earlier part of Dr Boerger's book deals with the prerequisites demanded of a competent agronomist. He indicates the pitfalls that surround the making of accurate observations and treats the question of collating the data of other investigators, and the general principles of experimental procedure, including statistical methods, and the elucidation of experimental results.

A subject of great importance, which the author considers in detail, though it is often ignored in treatises on scientific method, is the question of scientific literature. Dr Boerger points out the almost insuperable difficulties that obstruct research workers since Latin was dropped as the universal scientific language, and he shows how the present babel of scientific tongues necessitates the use of abstract journals and bibliographies.

The necessity of specialization and its inevitable disadvantages receive attention, also the value of personal contacts between research workers, the importance of scientific expeditions, and the institution of advanced courses for already qualified investigators.

Agronomy covers such a wide field that, in addition to its proper subject matter, those studying it should also be acquainted with the history of agriculture, agricultural geography, climatology, chemistry, engineering, statistics, economics, and of course the biological sciences, especially genetics and plant and animal pathology. Another important aspect of agronomy is the organization of research, and the relationship of the latter to university education. Scientific societies sponsoring agricultural research are very important, also scientific congresses and, most of all, properly endowed experimental stations.

In chapters XI and XII, the author develops his fundamental views on the philosophy of science. The former chapter is an essay on the application of scientific hypothesis, which is considered in relation to Vaihinger's philosophy of *als ob*, and the views expressed on this subject by Kant, Claude Bernard, Planck and Earl Russell. This chapter naturally involves a brief reference to the nature of scientific law and the meaning of causality. The latter chapter is the most personal of the whole book, and deals with the ultimate questions that eventually confront all scientific investigators as they do all men generally. Following Goethe, the author shows that questions of moral and religious values underlie the whole of science, and, moreover, that the rejection of these in favour of nihilism has a dangerously corrosive effect on the significance and integrity of scientific work. On this subject the author brings all his erudition to bear, and the reader is delighted to find Chinese philosophers, Seneca, St Ignatius of Loyola and Montaigne jostling each other on one page, Plato, Kant, Schopenhauer and Pasteur on another, with Cervantes and Julian Huxley awaiting their cues in the wings.

This book could only have been written by Dr Boerger. No other writer combines such a thorough knowledge of scientific agriculture with such an extensive knowledge of philosophy and the world's literature, especially the little-known philosophic works brought out in South America. Research workers in English-speaking countries are slow to realize that ideas are undergoing a thorough ferment in Latin America. Of this revolution, Dr Boerger is the coryphaeus.

WILSON, C. M. (Editor)

633-1.524(7+8)

New crops for the new world.

MacMillan Co., N.Y. 1945: \$3.50. Pp. viii + 295. 32 pls. tables.

Crops that in recent years have become important in the agriculture of the Americas, or are potentially valuable, are discussed in 16 chapters of much interest, each of which is the work of an expert. War conditions especially have stimulated a number of agricultural developments in the Americas, and intensified the relations of inter-American agriculture.

The cutting-off of supplies in other parts of the world has necessitated alternative sources; *Hevea* rubber and *Cinchona*, for instance, are now crops of increasing importance in tropical America. Such developments are bound to play an important part in the world supply of food and other commodities in the future. In the introduction, the journalistic remarks of the editor, Mr C. M. Wilson, are irritating, dressing up good business propositions in humanistic phrases and facile idealism. But the editor must be congratulated upon gathering together so interesting a company of authorities on a wide range of crops.

Dr W. Popenoe contributes a chapter on the possibilities of the mango, avocado, litchi, cherimoya and other fruits for tropical America, evoking a rich and appetizing picture of these fruits. This account is counterbalanced by Mr B. Y. Morrison's chapter on "Introducing American plants to the Americas", which discusses the problems of plant introduction, including fruits, from a more cautious and less gastronomic viewpoint. Dr W. Popenoe also describes investigations on *Cinchona*. Dr V. C. Dunlap contributes a report of experiments on the cultivation of *Vetivera* grass (*Vetiveria zizanioides*), abacá, timber trees and several other crops, in Honduras. Dr E. Anderson, the well-known authority on maize, writes a historical account of maize in the United States and Mexico. His brief sketch covers a wide field with admirable simplicity.

The history and present-day position of *Hevea* rubber production in Latin America are described by Dr W. N. Bangham. Dr. P. Honig, Chairman of the International Society of Sugar Cane Technologists, discusses the problems of world sugar cane production. The remaining chapters deal with palm oils and waxes, bamboos, drug and medicinal crops, the forest resources of tropical America, pepper, the flowers of the New World, silk production in South America, the biological control of insect pests, and livestock improvement. Each contribution is outstanding in its own special field, up-to-date and first hand, making the symposium a highly informative and very readable book, illustrated by 32 well chosen photographs.

HAUSSMANN, G.

633.11:575.127.5:633.289(45)

Il grano perenne; la sua origine e l'utilizzazione. (**Perennial wheat; its origin and utilization**).

Bologna-Edizioni Agricole. Pp. 82. (Undated). 14 figs. tables.

An outline is given of the work of previous authors in intergeneric hybridization in cereals, reference being made amongst others to the rye-wheat hybrids produced by the late Professor N. Strampelli. The variety Terminillo, from (Rieti x rye) x Rieti 1907, is now widely grown in the mountain zones of Italy, being hardy, late in ripening and totally immune to rust.

The greater part of the booklet is taken up by a description of the work of Cicin and others in the U.S.S.R. with *Triticum* x *Agropyron* hybrids (cf. *Plant Breeding Abstracts*, Vol. XV, Absts 602 and 1393). The author has himself worked in the U.S.S.R., and has since carried out experiments in Italy with some of the Russian material, including Nos 34085 and 23086, which are described. Reference is also made to the annual forms obtained from the same crosses. The author describes his own observations made on the Russian material while in Russia, and confirms the great vigour of growth, freedom from disease etc. of the hybrids of the *Agropyron* type. It is pointed out that though a thousand hectares were cultivated with *Agropyron* hybrids in 1940, they were still regarded as experimental and requiring much further elaboration and breeding.

As regards the results in Italy, hybrid No. 23086, though totally unattacked by rust and very vigorous, had a protracted period of maturity and the grains were tightly enclosed. The material was still segregating for a number of plant characters. The other type was more uniform but less rust resistant. Some plants survived into the second year but with reduced vigour; all had died by the third year. The hybrids showed considerable variation in drought resistance and some of the most resistant have been selected from among surviving plants in the field.

The hybrids are being subjected to further crossing with Italian wheat varieties, and their main interest seems to be for introducing characters such as robustness, tolerance of rigorous climatic conditions, disease resistance and so forth into the Italian wheats rather than for immediate cultivation.

The hybrids gradually lost the perennial habit and most of them prove susceptible to rust and other parasites; their grain is small and their ears are irregularly filled and it is considered doubtful that they will be able to compete in the main wheat areas with the present Italian varieties, which give yields of up to 50 centners per hectare, with an average of 25-30. In mountain zones and other unfavourable areas they may have a future, however, and it is thought they might be capable of being cultivated at higher altitudes. They are very resistant to spring drought but not to summer drought such as occurs in Italy, and further breeding work will be required before their capacity for drought resistance can be fully utilized. Some of the hybrids have been subjected to artificial drought in pots at a time corresponding to the normal incidence of drought in Italy, and certain plants have shown themselves to be much more resistant than others. It was further shown that the forms with a long vernalization phase were most resistant to spring drought, while those with short vernalization phase were more resistant to late summer drought. Artificial infection with *Tilletia Tritici* has shown the existence of certain immune plants, which have been selected.

ANDERSON, J. A.

633.11:577.15

Enzymes and their role in wheat technology.

Interscience Publishers, Inc., N.Y. 1946: Pp. ix + 371. tables. figs.

The collective monograph, with chapters written by specialists in the different branches of one subject, is establishing for itself a prominent place in the literature of biological science. The example before us is a business-like attempt to provide the cereal chemist with a detailed review of those aspects of enzymology of interest to him. Other chemists concerned with living organisms or their products will find it a valuable review, with some notable omissions, e.g. nucleases and adaptive enzymes. Since the book makes no concessions to the non-chemist, the latter will find it difficult reading and, in places, incomprehensible, without some preliminary reading, especially in physical chemistry.

The groups of enzymes considered are amylases, esterases, oxidases, proteases and the fermentation enzymes. Each group has devoted to it a general chapter and a technological chapter. An introductory chapter deals briefly with the general chemistry of enzymes and the book ends with an author and a subject index. Each chapter has a bibliography and it is pleasing to note that the references are given in full. There is a bad slip on p. 12, concerning values of Q10 for physical processes.

J. L. F.

633.15

Mais in uw moestuin. (Maize in your kitchen garden).

Rijksuitgeverij dienst van de Nederlandsche Staatscourant 's-Gravenhage 1944: Pp. 59. 29 figs.

This is an excellently produced booklet which tells the Dutchman how to grow maize in his garden, how to dry and store the crop, how to deal with diseases of the plants, and how to prepare various maize dishes. An alphabetical index and a bibliography completes the pamphlet.

PAUL, W. R. C.

633.18(54.8)

Paddy cultivation.

Department of Civil Defence, Colombo 1945: Pp. 90. 45 figs. tables.

A concise account is given of paddy cultivation in Ceylon, including the botany of the rice plant, the varieties suitable for the different areas, seed paddy and selection, systems of land tenure, the various aspects of cultivation, pests and diseases, the processes to which the crop is subjected after harvesting, and nutritional value. The need of improved methods of cultivation to secure substantially improved yields is paramount not only in Ceylon but the rest of India, and the other rice-producing countries of the Far East. The problem of increasing production is an involved one, for really improved methods of cultivation cannot be practised without social and economic reform. This booklet offers a modest but useful contribution to the study of the general problem of securing increased rice production.

LEP, P. M. (Editor)

633.63-1.521.5:575(47)

[Beet growing. (A symposium)].

Seljhozgis, Moscow 1941: 8 roubles. Pp. 436. 60 figs.

Information of interest to plant breeders is included in chapter 7, which is devoted to the selection and seed production of the sugar beet (pp. 322-362). Generally speaking, since 1924, selection of sugar beet in the U.S.S.R. has had three objectives: (1) increase in the root weight of different varieties so as to obtain an overall rise in gross yield; (2) increase of the sugar content of industrial strains; and (3) improvement in the output of pure sugar per unit weight of the commercial crop of raw beet. As an outcome of extensive investigations, Soviet research workers found that high yield and high sugar content can be combined and fixed in a single strain of sugar beet. In addition to producing such varieties, sugar beets giving a high seed yield have also been bred. Several strains resistant to disease, frost and drought have similarly been developed and introduced into commercial cultivation. Seed selecting stations and sub-stations for varietal testing exist in 50 different localities. In this way it has become possible to develop regionally adapted varieties, and thus to supply each producing centre with the most suitable seed. The methods of selection and breeding used in the seed production of commercial and experimental strains are described in detail. Information is also given on the agricultural technique employed in growing one and two year old plants for seed production. H. F.

PEDERSEN, A.

634:582(48.9)

Danmarks Frugtsorter. II. Paerer, blommer, kirsebær. (**Danish varieties of fruits. II. Pears, plums and cherries**).

Udgivet af Fællesudvalget for Frugtavløkonomi, Paa Alm. Dansk Gartnerforenings Bogforlag Nos 1-2: Pp. 128. photos. (Undated).

Judging from the two parts of Vol. II, available for review, this handsomely illustrated and well-produced work on Danish fruits should prove extremely valuable to horticultural experts, educational institutes concerned with fruit growing, or experienced amateur growers.

The two parts under review deal with pears of which thirty-two varieties are described in detail. For each variety the synonyms and history are given, followed by a detailed description of the tree and its fruits, with observations on its behaviour in the nursery, its requirements as regards cultivation and suitable root stocks, its resistance to diseases and pests, its ripening time, and finally, recommendations as to the value of the particular variety for the private or commercial grower, and the best way to grow it.

The illustrations include, in addition to coloured plates showing external and internal appearance of the fruits, the foliage and twigs, also photographs of the blossoms and the habit of the tree at various ages.

Under the direction of Professor A. Pedersen of the Royal Veterinary and Agricultural College (Kgl. Veterinær-og Landbohøjskole), over 40 persons have collaborated with great success in the production of an impressive and valuable record of Danish fruits.

634.11:582(49.2)

634.13:582(49.2)

634.22:582(49.2)

Nederlandsche Fruitsoorten. (**Dutch varieties of fruits**).

S. Gouda Quint-D. Brouwer en Zoon, Uitgevers, Arnhem. (Undated).

In this production, a finely illustrated series of loose plates have been brought together describing commonly grown Dutch varieties of apple, pear and plum. Coloured plates are given of the fruits of each variety, together with black and white plates of the longitudinal sections of the apple and pear fruits, and the branching habit in the case of the plums. For each variety, details are added on the genetical origin, shape and colour of the fruit, quality of the fruit, growth habit of the tree, adaptability to climatic and soil conditions, and on grafting, flowering and fruiting times, and susceptibility to disease.

The high standard of the coloured plates is alone sufficient to recommend this collection to anyone interested in the identification or cultivation of Dutch fruit varieties.

OLDHAM, C. H.

634.7(42)

The cultivation of berried fruits in Great Britain.Crosby Lockwood and Son, Ltd., London 1946: 21s. Pp. 374. 41 figs.
28 tables.

In recent years considerable information has been gained concerning the cultivation of the small bush fruits and strawberries in the British Isles, and on the older and newer varieties of this class of fruit. Marketing methods have also been improved. The production of fruits for the canning industry is another recent development growing in importance. For some time a book including up-to-date information has been needed, and the present handbook on all the aspects of the production of the small bush fruits and strawberry in the British Isles answers this need admirably. As an inspector for the Ministry of Agriculture, with many years' experience of soft fruit cultivation, Mr Oldham is well-qualified to write authoritatively on the subject. Black and red currants, blackberries and hybrid berries, raspberries, gooseberries and strawberries are described, with sections on the history and classification, types and varieties, geographical area of cultivation and imports, propagation, cultivation, picking and marketing, and the pests and diseases of each crop. The book is illustrated by 41 drawings and photographs, and is well-indexed. It provides a sound reference book for all those seeking information on the different problems of soft fruit production. Plant breeders will, in particular, find the sections on types and varieties handy.

MARTÍNEZ, M.

634.975:582(72)

Las Pinaceas Mexicanas. (The Pinaceae of Mexico.)

An. Inst. Biol. Univ. Méx. 1945: 16: Pp. 345. 300 figs.

No definitive monograph of the Pinaceae can ever be produced until a thorough study has been made of the numerous endemic species and varieties peculiar to Central America and in particular to Mexico. This area does in fact constitute one of the most important centres of variation of the family, and the Mexican forms are of great interest to tree breeders, taxonomists and foresters alike.

As a contribution to an understanding of these forms, Dr Martínez has produced a taxonomic study of the Mexican Pinaceae, volume one of which is concerned with the genus *Pinus*. The author opens his account with a general botanical description of the genus, following this by a description of the economic uses of the Mexican pines, and a brief account of their diseases and distribution in the various Mexican states.

The greater part of the book consists of detailed descriptions of each species and variety together with a list of localities. One of the best features of the book is provided by the numerous illustrations. Photographs are presented of the habit of each species, and figures are also given of the cones, seeds, leaves, the anatomical structure of the transverse section of the leaf, together with a map indicating the distribution of the species within Mexico.

This valuable account will prove essential for any future monographic work on the genus *Pinus*.

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